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The guidance format for each occupation includes five major topics: Personal Requirements, Education and Training Opportunities in Junior and Senior High School, Opportunities Beyond High School, Advancement and Outlook, and Related and Specialist Occupations.

The outlines are intended to help the student identify and appraise his own pattern of aptitudes, interest, and other personal qualifications. They serve to acquaint him with available industrial education programs and employment possibilities.

The outlines include: auto mechanic jobs; drafting jobs -- architectural, industrial, and electrical; electronics positions; graphic arts occupations — book binder, linotype operator, and photoengraver; industrial crafts — camera repairs, leather worker, optician, and shoe repairman; metal working jobs; and finally, woodworking occupations such as carpentry and cabinet making.

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CAREERS
RELATED TO
INDUSTRIAL EDUCATION

EVALUATION AND RESEARCH SECTION • No. 260
LOS ANGELES CITY SCHOOLS

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U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
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CAREERS RELATED TO INDUSTRIAL EDUCATION

A Collection of Career Guidance Outlines to Assist with Planning and Preparation for Occupations with Industry

For the Reference Use of Industrial Education Teachers, Counselors, and Advisers

Educational Materials Laboratory
Office of Education
MAR 11 1965
DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

LOS ANGELES CITY SCHOOLS

Prepared by
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1964

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"The person who guides a young student toward the crucial decision of what he is going to be should be able first of all to appraise the aptitudes and interests of the student concerned. Then he must know about the various curriculums available in the school, the requirements for entrance, the sorts of abilities involved, and also the employment possibilities in the various fields."

-- J. Chester Swanson
"Whither Vocational Education?"
NEA Journal
October, 1963, p. 60

FOREWORD

In the past several years the challenge of new and rapidly changing technologies has provoked a widespread and renewed interest in programs of industrial education. The public has become increasingly aware of the vital role played by the schools in providing the basic knowledge and technical skills required for employment with industry.

Careers Related to Industrial Education provides guidelines to appropriate preparation for careers with industry. It is a step toward the support of a community interest in the development and maintenance of a reservoir of trained manpower skills. Here is educational direction for students who are suited to pursue pre-employment preparation through programs or specialized courses in the subject areas of industrial education. The outlines contained in this collection will be used by industrial education teachers and school counselors at all educational levels to advise students who can benefit from these programs. For other members of the school staff, these career guidance outlines are a reminder of the abilities useful to modern industry and the programs and classes especially designed to facilitate their development.

It has long been recognized that students in the academic fields have a wealth of materials available to assist with educational decision. Less fortunate are the students and advisers of students who may wish to consider the field of industrial education. For them such materials are meager. It is hoped that this publication will atone in part for the deficit. Perhaps also it may be an incentive to the discussion and development of guidance materials useful to other subject fields contained within the broad spectrum referred to as vocational education.

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INTRODUCTION

This collection of career guidance outlines, Careers Related to Industrial Education, has been prepared for industrial education teachers who advise youth about careers in the allied subject areas of auto mechanics, industrial crafts, drafting, electronics, graphic arts, metal, and woodwork. Additionally, the outlines are intended as an aid in vocational advisement for the reference use of counselors, advisers, teachers of junior high school guidance units, teachers of the tenth-grade guidance classes, coordinators for work-experience education, and other members of the secondary school staff who may have a vocational guidance responsibility.

These career guidance outlines define the pattern of abilities and other characteristics which contribute to successful performance in occupations associated with industry. They point also to the courses and curriculums which can develop these abilities and characteristics.

Education and pre-employment training opportunities to provide the knowledge and performance skills for these and other occupations with industry are offered by the Los Angeles City Schools in junior and senior high school, in adult school, and at the junior college level.

The careers presented in this collection are representative of many occupations which require preparation through industrial education. Obviously, the collection does not include all occupations which fall into this classification. Additional descriptions are to be inserted as needed. A loose-leaf arrangement of the outlines makes this possible.

THE GUIDANCE FORMAT

The outline of information for each occupation has five major topics. They are:

1. Personal Requirements
2. Education and Training Opportunities in Junior and Senior High School
3. Education and Training Opportunities Beyond High School
4. Advancement and Outlook
5. Related and Specialist Occupations

The guidance provided through the format is directed towards the individual. Does he have the capacity and motivation to learn the skills and acquire the knowledge the occupation requires? Is he aware of the training programs which can prepare him for employment?

The implications for career planning and progress suggested by the outline are discussed section by section in the material which follows.

PERSONAL REQUIREMENTS

The opening section of the guidance format offers a means of comparing the capacities of the student, present and potential with those required by the occupation. The descriptions represent the combined judgment of occupational analysts especially trained to rate the presence or absence of a characteristic in the job situation. The reference resource for this information was the government publication, Estimates of Worker Trait Requirements for 4,000 Jobs (18).*

Personal requirements represent qualities essential to acceptable work performance. Also, they are closely related to the attainment of satisfaction in work, to the development of skill flexibility, and to continuing career development. In the career guidance outline, they are classified and described as abilities and aptitudes, temperaments, interests, and physical capacities.

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* With the exception of the technician occupations for which the reference was Technical Occupations in Research Design and Development (34).

Abilities and Aptitudes -- Abilities required by the occupation are described operationally in terms of educational development. The worker must be able to function in one or more of the ways described.

Aptitudes are reported if utilized in high degree or average amount. An aptitude is the individual's capacity to learn how to perform adequately a task or job duty. It is a potential ability which can be developed through education, training, and experience.

Temperaments -- These personal qualities are fairly constant behaviors consistently required in the work situation. They contribute to individual motivation for performing in the manner required. Different occupations utilize different patterns of temperaments just as they require different amounts and combinations of abilities and aptitudes.

Interests -- Interests represent an attitude, a positive preference for a certain kind of activity. This preference may indicate an indifference toward or possibly the rejection of an opposing interest. For example, an interest preference for activities related to processes, machines, and techniques may be accompanied by a dislike for activities related to social situations involving people.

Physical Capacities -- Physical capacities are keyed to the demands of the work environment and the tasks associated with the occupation. These include the bodily movements, strength, stamina, and coordination required by the work situation. For example, the occupation may require a worker who can do heavy work or one who is not affected by extreme heat or noise.

The factors characteristic of related working conditions may be one or more of the following: Inside or Outside; Extremes of Cold plus Temperature Changes; Extremes of Heat plus Temperature Changes; Wet and Humid; Noise and Vibration; Industrial Hazards; and Fumes, Odors, and Toxic Conditions. These factors are described in the basic reference, Estimates of Worker Trait Requirements (18:145-155).

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

The related high school major sequence, sometimes more than one, is named in this section. The subjects involved in the sequence provide educational preparation and pre-employment training for the occupation. Elective courses available in junior and senior high school are likewise suggested. These have been selected to round out the area of specialization and preparation. For this reason the suggested electives may be in industrial education or in some other subject field. They are named alphabetically and not in any order of preference.

High school graduation is recommended as the desired minimum of educational preparation. Employment with industry is becoming more difficult for the applicant who does not hold a high school diploma. If not yet a prerequisite for some of the occupations in Careers Related to Industrial Education, probably within the next few years it will be required for entry. Educational and technical qualifications for all occupations are being rapidly upgraded to match the demands of changing skill requirements.

The senior high school's Industrial Education program includes four major sequences. They are: the Industrial Arts, the Industrial Occupations, the Technical, and the Industrial Technology sequences. Of these four majors, the Industrial Arts program provides broad experiences in a variety of subject areas typical of industry. For students who decide upon an area of industrial specialization while still in high school, there are opportunities for concentrated preparation and training in the Industrial Occupations, the Technical, or the Industrial Technology major sequences. Each of these programs is designed to develop technical knowledge, skills, and work habits suitable to a family of industrial occupations. By way of illustration, a typical offering in the Industrial Occupations program is the preparation and training for the metal trades. In this subject area, students may gain a broad experience in welding, both gas and arc; in machine shop, sheet metal, foundry practice, and forging and heat treating. Metal working skills are useful also in related areas as for example, the plumbing business.

The industrial education programs available in high school provide for many students an entry into industry. The major sequence, any one of four, provides for the progressive development of a repertoire of basic skills important to a family of industrial occupations. Suggested electives may lead to the discovery of talent and interest, reinforce recognized abilities, or supply complementary knowledge and technical skills.

Those students who enter employment following high school graduation may continue their education while employed through extension courses in a junior college or adult school of the Los Angeles City Schools. Opportunities for advanced instruction and valuable training experiences at the post-high school level are presented in the next section of the career guidance outline.

Vocational advisers are reminded that for students who plan to attend college, the high school major in Industrial Technology meets the entrance requirements of the University of California.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

With the exception of the occupational specialties referred to under "Armed Forces," the programs named in this section are offered tuition-free by the Los Angeles City Schools. At the post-high school level, educational preparation may include an occupation-centered curriculum at the college level, job-related courses in college or adult school, an apprenticeship program, or special schooling with the armed forces.

Junior College -- There are seven junior colleges in the Los Angeles City Junior College District.* One or more of these colleges offer the industrial occupations curriculums named in the guidance format. The colleges offer two-year curriculums, in some instances a one-year curriculum, as employment preparation for the student attending full-time day school; and varied curriculums in the evening school for the student who is employed and attends school part-time.

The predominant portion of the curriculum offered in the college evening program is designed to supplement the daily work experience of persons employed in industrial occupations and to assist them with upgrading their skills for job improvement and advancement. Manipulative skills required for some of the occupations included in this collection are taught in the shops and laboratories of the colleges, while the technical subjects related to such occupations are taught in the classrooms.

The college or colleges which offer a designated curriculum may be identified by referring to the annual bulletin, "Occupational Curricula Offered in the Colleges of the Los Angeles City Junior College District" (27). The school's reference copy of the latest edition is available in the counselor's office. For a description of the course offerings which comprise each curriculum, the reader is referred to the annual catalog of the college or colleges which offer the curriculum. In most secondary schools, a reference set of these catalogs is available both in the school library and the counseling office.

Adult School -- There are twenty-seven adult schools in the Los Angeles Unified School District. Each of these schools offers a course or courses for most of the occupations included in this publication. Nearly all such courses are offered in the evening; and while some courses provide pre-employment skills, the majority serve to supplement the work experience of persons already employed and to assist such students toward improving their work skills and preparing for job advancement.

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* East Los Angeles, Los Angeles City, Harbor, Metropolitan, Pierce, Trade-Technical, and Valley Colleges.

The adult schools teach shop and laboratory skills so far as high school plant facilities will permit. A majority of the industrial courses taught in the adult school involve the teaching of technical subjects related to the student's job.

Each adult school is located on the grounds of a day high school. For the locations of the twenty-seven adult schools and for course descriptions, the reader is referred to the Catalog of Authorized Subjects for Adult Schools (12) which is on file in the counseling office.

Apprenticeship Programs -- The apprentice program provides training opportunities for qualified youth to "earn while they learn" a skilled trade or technical occupation. The program combines schooling with on-the-job work experience, and normally involves a training period of two to six years in length. The average training involves four years of on-the-job work experiences, usually forty hours per week, supplemented with 144 hours or more per year of schooling in technical subjects related to the work experience.

If an apprenticeship program is indicated, the number of training years required is shown in parentheses following the designation of the apprenticeship. If an apprenticeship program is not named, there is none for the occupation or it is not offered in the Los Angeles area.

The apprentice program operates under the provisions of the state apprentice law and is under the local control of joint labor-management apprenticeship committees working in cooperation with the public schools.

Entrance into the majority of apprentice programs requires high school graduation and the satisfactory passing of other entrance tests, such as aptitude, interest, and skill tests. The applicant must first obtain employment as an apprentice with an employer certified, or eligible for certification, to train apprentices. Age requirements for entrance into most programs range between sixteen and twenty-six years.

All indentured apprentices must sign a formal agreement with an employer or with the joint apprenticeship committee certified to train apprentices under the state-approved program.

For general information on apprenticeship, consult materials in the counseling office. For specific information, call the Apprentice Education Office of the Los Angeles City Schools.

Armed Forces -- Placement in the military which may lead to the same or a similar occupation is indicated for the several branches of the Armed Forces by career field, an area, or by occupation. Special schooling is offered in connection with some of these military assignments either through subject classes or an organized instructional program of technical information.

For further information concerning education and work experience with the military, the user of these outlines is referred to the Occupational Handbooks of the Army, the Navy, and the Air Force (29, 30, 28). These reference aids are usually available in the school library. In using these handbooks, the reader should look for a military career brief of the same title as is given under "Armed Forces" for a particular branch of the military. The High School News Service Report (1) is a second reference on occupational training and educational programs offered by the military services.

ADVANCEMENT AND OUTLOOK

The possibilities for advancement in the occupation are disclosed in this section of the career guidance outline. The vocational adviser will note that the line of advancement may be vertical or horizontal. For example, the cylinder press man may be promoted vertically, in an upward movement, to foreman or shop superintendent; or, he may move horizontally into sales or purchasing. As a third possibility, he may establish his own business in which case the two types of advancement are combined.

Horizontal Advancement -- Movement on the horizontal may take the worker from one machine to another, from one product to another, between departments, between plants, and about the country. Horizontal advancement suggest the desirability of a flexible plan, adaptability to changes in the work environment, and readiness for retraining in the event of new opportunities. The high school Industrial Education majors provide a broad background for this flexibility.

Vertical Advancement -- The vertical type of advancement permits the worker to move upward in a hierarchy of positions. Each rung on the ladder represents, successively, a position higher in authority with enlarged responsibilities. This kind of promotional opportunity is more widely recognized than the horizontal even though the latter type of advancement is strategic to the career development of many individuals.

Employment Outlook -- Prospects for future employment in the occupation are briefly indicated. These may depend on replacement needs, growth factors, consumer demand; changes in materials, products, or manufacturing methods; or the development and expansion of a new industry.

RELATED AND SPECIALIST OCCUPATIONS The concluding section of the career guidance outline identifies related and specialist occupations. These occupations use a similar pattern of personal qualifications and educational preparation.

In planning ahead, it is important for the student to know of the availability of various occupations which can utilize his talents in the event he cannot secure employment immediately in his preferred occupation. The related and specialist occupations allow, also, for mobility during the course of a lifetime career and assure greater possibility of continuing employment.

In the event of transfer or promotion to a related or specialist occupation, some retraining or additional education and skill training may be necessary. The prospective employee should be aware of this probability.

JOB TITLE AND CODE

The heading of the career guidance outline contains three items of information: The standard occupational title, the code classification of the Dictionary of Occupational Titles (the D.O.T.), and the industry or industries with which the occupation is associated. While these terms with the exception of the code number are more or less self-explanatory, a few comments may be of interest.

OCCUPATIONAL TITLE Each occupation is referred to by the standard title reported in the Dictionary of Occupational Titles (14). Alternate titles are given also for the convenience of the reader. In addition, the same occupation may be known locally by other titles.

For a definition or description of the occupation, the vocational adviser is referred to Volume I of the Dictionary, Definitions of Titles. The dictionary definition tells what the worker does; indicates the materials, products, subject matter or services involved; and names the machines, tools, equipment and work aids used. For student reading, an occupational abstract, brief, or guide is recommended.

D.O.T. CODE The D.O.T. code number indicates the major occupational group and the subgroup to which the occupation is assigned. This reference number has five or six digits. The first digit indicates the major occupational group; the next two digits indicate the subgroup; the last two or three digits refer to the specific occupation within the subgroup.

To illustrate, the D.O.T. code number for Instrument Maker is 4-75.130. This code number may be interpreted as follows:

- -- The first digit "4" indicates the major group of "Skilled" occupations.
- -- The next two digits "75" indicate the subgroup "Machinist."
- -- The last three digits "130" are reserved for the specific occupation within the subgroup, "Instrument Maker."

Job Title and Code

It is helpful to know the meaning of the first digit which indicates to a degree the difficulty and complexity of the work. The major occupational groups are shown below, each group with its identifying digit.

D.O.T. CODE FOR THE MAJOR OCCUPATIONAL GROUPS

Identifying Digit	Major Occupational Groups
0	Professional and Managerial
0-0 thru 0-3	Professional
0-4 thru 0-6	Semiprofessional
0-7 thru 0-9	Managerial
1	*Clerical and Sales
1-0 thru 1-4	Clerical
1-5 thru 1-9	Sales
2	*Service
2-0	Domestic Service
2-2 thru 2-5	Personal Service
2-6	Protective Service
2-8 thru 2-9	Building Service Workers and Porters
3	*Agricultural, Fishery, and Forestry
3-0 thru 3-4	Agricultural and Horticultural
3-8	Fishery
3-9	Forestry (except Logging) and Hunting and Trapping
4 and 5	Skilled
6 and 7	Semiskilled
8 and 9	Unskilled

---

* Occupations in this grouping represent a number of skill levels.

ARRANGEMENT AND USE OF THE OUTLINES

ARRANGEMENT OF THE OUTLINES

The career guidance outlines included in this collection are arranged alphabetically within the subject areas of industrial education. For example, those occupations related to electronics will be found in alphabetical order in the Electronics section; those requiring a broad base of preparation in drafting will be found in the Drafting section, and so on. Reference to the Contents will enable the reader to identify the occupations which are available for a particular subject area.

For locating a particular occupation, the reader should refer to the Alphabetical Index of Occupations and note the matching subject area which is named opposite the occupational title. The occupation may then be located by referring to the subject area section.

Each outline is restricted to two sides of a single sheet of notebook paper, size 8½ x 11 inches. A loose-leaf arrangement of the outlines offers these advantages:

1. The section of greatest interest may be moved to the front of the book for ready reference.
2. It is possible to withdraw an occupational outline when necessary.
3. Additional outlines may be inserted to cover occupations which have been omitted or to report new occupations which are constantly emerging.
4. The outlines may be arranged alphabetically by title if desired.

USING THE OUTLINES

The career guidance outlines have been designed to assist with educational and career planning. For industrial education teachers, the material has application to those instructional units concerned with related technical and occupational information. The following uses are suggested for both teachers and counselors:

1. To help the student identify and appraise his own pattern of aptitudes, interests, and other personal qualifications. Is the combination similar to that required for the occupation? Should he be encouraged to consider an educational and pre-employment program leading to a career with industry?

2. To acquaint the student with industrial education courses in junior and senior high school which can develop his particular combination of aptitudes, abilities, interests and temperaments, and physical capacities.

3. To advise the student of various kinds of advanced education and pre-employment training programs beyond high school which can help him to increase his employment prospects and opportunities for advancement.

4. To point to some of the employment possibilities available to a high school graduate who has completed a major sequence in an industrial education curriculum.

5. To advise the student about the promotional possibilities for an occupation and the related career opportunities thus broadening his occupational horizon and extending his career perspective.

Using the career guidance outline in this manner as a point of departure, the vocational adviser can help the student to make his educational decision in the direction of careers for which he is qualified to prepare.

USING THE BIBLIOGRAPHY

References in the bibliography may be used to supplement the career guidance outlines. Student reading references are listed in Part A. Resource materials for the reference use of counselors and industrial education teachers are named in Part B. Some of the references among the resource materials are appropriate for student use. These have been identified by an asterisk which precedes the title.

CAREER GUIDANCE OUTLINES . . .

AUTO MECHANICS

Automobile Mechanic

Diesel Mechanic

Engine Development Technician,
Internal Combustion

Salesperson, Automobile Parts

Truck Mechanic

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D.O.T.: 5-81.010

Industry: Automotive Services

AUTOMOBILE MECHANIC

Known also as: automobile repairman or service mechanic; garage man, mechanic or repairman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: spatial visualization and manual dexterity. Average: form perception, motor coordination, and finger dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through activities resulting in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to stoop and kneel; to reach, and handle small to large parts. Talking: imparting oral information. Hearing: sensitive, attuned to fine discriminations in sound, as for example, in making adjustments on a running engine. Visual acuity. Inside working conditions. Exposure to fumes, odors, and toxic conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in auto mechanics.

Suggested Electives - Junior High: electricity, metal. Senior High: electronics, heavy metal, light metal, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculum: Auto Mechanics. Also, evening courses.

Adult School - Classes such as auto electrics, auto mechanics, auto turn-up, automatic transmission, industrial mathematics.

Apprenticeship Program - Automotive Mechanics. (4)

Armed Forces - Army: Armor; Automotive Maintenance; Engineer Equipment Maintenance. Air Force: Motorized and Miscellaneous Equipment Maintenance. Navy: Engineman; Mechanic.

ADVANCEMENT AND OUTLOOK

To troubleshotter, foreman, or service manager. May open an automotive repair shop, auto parts store, or service station. May move into auto sales. A steady increase in automobile registrations and the increasing complexity of automobile design should create additional needs for skilled automotive repairmen. The trend is toward a more technical job requiring systematic and specialized training.

RELATED AND SPECIALIST OCCUPATIONS

automobile brakeman and front end specialist
automobile parts salesperson
automobile radiator man
automobile repair serviceman
automobile salesman
automotive electrician (tune-up man)
heavy duty equipment mechanic
motor analyst
parts storekeeper
service station attendant
transmission repairman
truck mechanic

D.O.T.: 5-83.931

Any industry

DIESEL MECHANIC

Known also as: heavy duty equipment mechanic

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to solve practical problems; to interpret a variety of instructions in written, oral, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: manual dexterity. Average: verbal and numerical aptitudes, spatial visualization, form perception, motor coordination, and finger dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Strength for heavy work. Ability to stoop and kneel, to reach and handle tools and equipment. Talking: imparting oral information. Hearing: sensitive, attuned to fine discriminations in sound, as for example, in making adjustments on a running engine. Visual acuity. Inside working conditions. Exposure to fumes, odors, and toxic conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in auto mechanics.

(Turn the page.)

Suggested Electives - Junior High: electricity, metal. Senior High: electronics, heavy metal, light metal, industrial mathematics, industrial science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Auto Mechanics; Diesel Engine Mechanic; Heavy Truck and Diesel. Also, evening courses.

Adult School - A class such as industrial mathematics.

Apprenticeship Programs - Diesel Mechanics; Truck Mechanics. (4)

Armed Forces - Army: Marine Operations and Maintenance; Engineer Equipment Maintenance. Air Force: Motorized and Miscellaneous Equipment Maintenance. Navy: Engineman; Mechanic.

ADVANCEMENT AND OUTLOOK

To troubleshooter, foreman, or service manager. May serve as manufacturer's representative for repair of equipment sold or leased. May open a shop for repairing and rebuilding diesel engines. May move into sales. The economic advantages of the diesel engine suggest the continued use of this source of power in expanding and growing industries. The great demand for sturdy, long-lived diesel engines should result in a substantial increase in jobs for diesel mechanics.

RELATED AND SPECIALIST OCCUPATIONS

automobile mechanic
engine development technician, internal combustion
engineering assistant, mechanical equipment
locomotive repairman, diesel
truck mechanic

D.O.T.: 0-67.42

Industry: Automobile Manufacturing

ENGINE DEVELOPMENT TECHNICIAN, INTERNAL COMBUSTION

Known also as: engine test assistant, experimental technician, field engineer, mechanical technician

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles of scientific thinking: to define problems, collect data, establish facts, and draw valid conclusions; to interpret technical instructions in books and manuals; to deal with several abstract and concrete variables. Ability to apply mathematical procedures involving algebra, geometry, and trigonometry. High: numerical aptitude and spatial visualization. Average: verbal aptitude, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving the evaluation of information against measurable criteria such as standards, specifications, precision instruments, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for working with processes, machines or techniques in activities of a scientific and technical nature. An interest in abstract and creative activities involved in problems of engine design.

Physical Capacities - Medium to heavy strength. Ability to stoop, reach, manipulate; to utilize tools and equipment. Hearing: sensitive, distinguishing unusual sounds in engine performance. Visual accommodation. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with a Technical, or an Industrial Technology, major; or an Industrial Occupations major in auto mechanics.

Suggested Electives - Junior High: electricity, metal, industrial crafts,

(Turn the page.)

industrial drawing. Senior High: algebra, electronics, geometry, light metal, heavy metal, industrial mathematics, industrial science, trigonometry.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Auto Mechanics; Electrical Engineering Technology; Engineering Technician; General Engineering Technician; Machine Shop; Machine Tool Technology; Mechanical Engineering Technology; Mechanical Technology; Metallurgical Technician. Also, evening courses.

Adult School - Classes such as auto mechanics, electrical theory, industrial mathematics, machinist, mechanical drafting.

Armed Forces - Army: Armor; Motor Maintenance; e.g., Aircraft, Automotive, Engineering Equipment, and Railway Precision Maintenance. Air Force: Maintenance; e.g., Aircraft and Missiles, Munitions and Weapons, Motorized and Miscellaneous Equipment, and Metalworking Maintenance. Navy: Aviation Machinist's Mate; Construction Mechanic; Engineman; Instrumentman; Machinery Repairman.

ADVANCEMENT AND OUTLOOK

To supervisor. May go into management. With additional education, may qualify as a mechanical engineer. Employment outlook is excellent because of anticipated growth in the use of automobiles, aircraft, pleasure boats, motorcycles, and other types of transportation equipment.

RELATED AND SPECIALIST OCCUPATIONS

engineering propulsion development technician (rockets)
frame test engineer (motorcycles)
machinist
mechanic: auto, diesel, motorboat, motorcycle, or truck
mechanical engineering technician (steam turbine)

D.O.T.: 1-75.22

SALESPERSON, AUTOMOBILE PARTS

Industry: Automotive Services

Known also as: automobile parts stock clerk, counterman, parts man, parts storekeeper

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out instructions in written, oral, or diagram form; to deal with problems involving several concrete variables; to understand words and ideas and use them effectively; to use arithmetic involving fractions, decimals, and percentages. Average: verbal and numerical aptitudes, spatial visualization, form perception, and manual dexterity.

Temperaments - Situations involving people and the necessity to influence their opinions, attitudes, or judgments about ideas or things.

Interests - Preference for dealing with things and objects through activities involving business contact with people.

Physical Capacities - Medium strength. Ability to reach and handle parts and tools. Talking: imparting oral information clearly and accurately. Hearing: receiving information through oral communication. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in auto mechanics.

Suggested Electives - Junior High: electricity, metal. Senior High: electronics, heavy metal, light metal, industrial mathematics, industrial science, merchandising, salesmanship, speech.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculum: Auto Mechanics; Merchandising (one or

(Turn the page.)

two-year program). Also, evening courses.

Adult School - Classes such as auto mechanics, industrial mathematics, merchandising, salesmanship, speech.

Apprenticeship Program - Sales occupations do not use a formalized apprenticeship program as a means of training. However, completion of the four-year apprenticeship for automotive mechanics is usually given recognition in the selection of an automobile parts salesperson.

Armed Forces - Army: Automotive Maintenance; General and Parts Supply. Air Force: Motorized and Miscellaneous Equipment Maintenance; Supply. Navy: Engineman: Mechanic; Storekeeper.

ADVANCEMENT AND OUTLOOK

To assistant parts manager, to parts manager in large companies. With experience, business acumen, and the necessary capital, may establish his own business. May transfer to the sale of aircraft parts, construction or hardware supplies, or marine supplies. May transfer to parts assembly or to parts repair with a manufacturing or rebuilding firm. It is expected that employment will keep pace with the anticipated growth of the automobile industry. A trend should be noted, however, toward the sale of automobile parts assemblies instead of individual parts.

RELATED AND SPECIALIST OCCUPATIONS

accessories repairman
accessory installer
automobile body parts assembler
automobile mechanic
sales engineer
salesperson, hardware
salesperson, marine supplies
salesperson, tools
stock clerk

D.O.T.: 5-81.030

Industry: Automotive Services

TRUCK MECHANIC

Known also as: automobile and truck mechanic

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. Average: spatial visualization, form perception, and finger and manual dexterities.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Strength for heavy work. Ability to stoop, kneel, reach; to handle parts, tools, and equipment. Talking: imparting oral information accurately. Hearing: sensitive, attuned to fine discriminations in sound, as for example, in making adjustments on a running engine. Visual acuity. Inside working conditions. Exposure to fumes, odors, and toxic conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in auto mechanics.

Suggested Electives - Junior High: electricity, metal. Senior High:

(Turn the page.)

electronics, heavy metal, light metal, industrial mathematics, industrial science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Auto Mechanics; Heavy Truck and Diesel; Truck Mechanic. Also, evening courses.

Adult School - Classes such as auto electrics, auto body and fender repair, auto mechanics, auto tune-up, automatic transmissions, industrial mathematics.

Apprenticeship Program - Truck Mechanics. (4)

Armed Forces - Army: Armor; Automotive Maintenance; Engineer Equipment Maintenance. Air Force: Motorized and Miscellaneous Equipment Maintenance. Navy: Engineman; Mechanic.

ADVANCEMENT AND OUTLOOK

To leadman, foreman, shop superintendent. With teaching ability may become a shop instructor in establishments that conduct training programs. May establish his own shop for heavy-duty automotive repair. May transfer into transportation. Trucking is a growth industry, constantly expanding, and the maintenance of trucking equipment provides thousands of jobs for mechanics. Workers will continue to be in demand if only to fill jobs created by normal trunover.

RELATED AND SPECIALIST OCCUPATIONS

automobile generator repairman
automobile mechanic
auto body repairman, metal
brake repairman
bus mechanic
construction equipment repairman
diesel mechanic
motor analyst
motorcycle repairman

CAREER GUIDANCE OUTLINES . . .

DRAFTING

- Architectural Draftsman
- Electrical Draftsman
- Industrial Designer
- Marine Draftsman
- Mechanical Draftsman
- Technical Illustrator
- Tool Designer

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D.O.T.: 0-48.05

Industry: Construction

ARCHITECTURAL DRAFTSMAN

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to understand and apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: Numerical aptitudes, spatial visualization, form perception, and finger dexterity. Average: verbal aptitude, clerical perception, motor coordination, manual dexterity, and color discrimination.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and precision instruments; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfactions.

Physical Capacities - Sedentary strength, walking and standing required only occasionally. Ability to reach and handle light materials and drafting tools. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in architectural drafting.

(Turn the page.)

Suggested Electives - Junior High: general metal, industrial drawing, wood. Senior High: general metal, industrial drafting, industrial mathematics, technical drafting, technical illustration, woodwork, industrial science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Architectural Drafting (One or two-year program); General Drafting. Also, evening courses.

Adult School - Classes such as architectural drafting and mechanical drafting.

Armed Forces - Army: Drafting and Cartography. Air Force: Photomapping. Navy: Draftsman.

ADVANCEMENT AND OUTLOOK

To junior, senior, chief draftsman. With additional education, may qualify as an architect, building contractor, or construction engineer. Continued expansion in residential, industrial, and commercial construction is anticipated over the long run. Urban redevelopment programs have been favorably received and give promise of additional employment.

RELATED AND SPECIALIST OCCUPATIONS

draftsman:

- aeronautical
- civil
- commercial
- construction
- design
- heating and ventilating
- marine

D.O.T.: 0-48.11

Industry: Construction; Light, Heat and Power

ELECTRICAL DRAFTSMAN

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to understand and apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: numerical aptitude, spatial visualization, form perception, motor coordination, and finger dexterity. Average: verbal aptitude and manual dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and precision instruments; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques.

Physical Capacities - Sedentary strength. Walking and standing required only occasionally. Ability to reach and handle light materials and drafting tools. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in mechanical drafting; or the Technical major sequence.

Suggested Electives - Junior High: electricity, metal, wood, industrial crafts, industrial drawing. Senior High: electronics, general metal, industrial

(Turn the page.)

mathematics, architectural drafting, industrial science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electro-mechanical Drafting; General Drafting; Electrical Engineering Technology. One-year Curriculum: Electronics Drafting. Also, evening courses.

Adult School - Classes such as electrical theory, electrical wiring and code, electronics, mechanical drafting.

Armed Forces - Army: Drafting and Cartography. Air Force: Photomapping. Navy: Electrician's Mate; Draftsman.

ADVANCEMENT AND OUTLOOK

To junior, senior, chief draftsman. May be promoted to a supervisory or managerial position. With additional education, may qualify as an electrical engineer or designer. With some firms, may become a title searcher, electrical or electronic estimator, or inspector. Growth is anticipated in the production of electronics equipment for industrial, commercial, and military use. Expansion in new construction in this area will create a need for large number of electrical and electronics draftsmen.

RELATED AND SPECIALIST OCCUPATIONS

draftsman:

- aeronautical
- civil
- commercial
- construction
- design
- electronics
- geological
- geophysical
- hydraulic
- landscape
- map
- marine
- mechanical
- radio
- structural
- topographical

D.O.T.: 0-46.88

Any industry

INDUSTRIAL DESIGNER

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles of scientific thinking: to define problems, collect data, establish facts, and draw valid conclusions; to interpret a variety of technical instructions; to deal with several abstract and concrete variables. Ability to apply mathematical procedures involving algebra, geometry, trigonometry, and calculus. High: numerical and verbal aptitudes, spatial visualization, and form perception. Average: motor coordination and finger and manual dexterities.

Temperaments - Situations involving a variety of duties and frequent change; and the evaluation of information against sensory or judgmental criteria based on knowledge and experience.

Interests - Preference for activities of an abstract and creative nature resulting in tangible, productive satisfaction.

Physical Capacities - Sedentary strength. Walking and standing required only occasionally. Ability to reach and handle light materials and tools. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Technology major in mechanical drafting.

Suggested Electives - Junior High: art, electricity, metal, wood, industrial crafts, industrial drawing. Senior High: advanced mathematics, art, auto

(Turn the page.)

mechanics, electronics, general metal, mechanical drafting, physics, woodwork.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Design Drafting; Electro-mechanical Drafting; General Drafting; General Engineering Technician; Machine Design Technology; Mechanical Engineering Technology; Technical Graphics; Tool Engineering Technology. Also, evening courses.

Armed Forces - Army: Drafting and Cartography. Air Force: Photomapping. Navy: Draftsman.

ADVANCEMENT AND OUTLOOK

The industrial designer may be employed as a consultant or as a member of the staff of a large corporation. May go into advertising or become self-employed. Automation intensifies the need for thorough and exhaustive planning of new equipment. Accelerated growth has been characteristic of this profession in recent decades and the demand for industrial designers is expected to continue.

RELATED AND SPECIALIST OCCUPATIONS

detailer
detail draftsman
die designer
mechanical draftsman
optical designer
tool designer

D.O.T.: 0-48.16

MARINE DRAFTSMAN

Industry: Ship and Boat Building
and Repair

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to understand and apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to utilize arithmetic, algebra, and geometry in practical applications. High: numerical aptitude, spatial visualization, form perception, motor coordination, and finger dexterity. Average: verbal aptitude, clerical perception, and manual dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and precision instruments; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques.

Physical Capacities - Sedentary strength. Walking and standing required only occasionally. Ability to reach and handle light materials and tools. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in mechanical drafting; or the Technical major sequence.

Suggested Electives - Junior High: electricity, metal, wood, industrial crafts,

(Turn the page.)

industrial drawing. Senior High: architectural drafting, electronics, general metal, industrial drafting, mathematics, mechanical drafting, science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Architectural Drafting; Electro-mechanical Drafting; General Drafting; Machine Design Technology; Mechanical Engineering Technology; Technical Graphics. Also, evening courses.

Adult School - Classes such as architectural drafting, mathematics, mechanical drafting.

Armed Forces - Army: Drafting and Cartography. Air Force: Photomapping. Navy: Draftsman.

ADVANCEMENT AND OUTLOOK

To junior, senior, chief draftsman. May be promoted to a managerial or supervisory position. With additional education, may qualify as a marine architect. The long-term outlook is one of growth. Future employment opportunities will parallel developments in shipbuilding and repair.

RELATED AND SPECIALIST OCCUPATIONS

draftsman:

architectural
electrical
hull
hydraulic
industrial
mechanical
sheet-metal
ship engineering

D.O.T.: 0-48.18

Any industry

MECHANICAL DRAFTSMAN

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to understand and apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: numerical aptitude, spatial visualization, form perception, motor coordination, and finger dexterity. Average: verbal aptitude, clerical perception, and manual dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and precision instruments; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques.

Physical Capacities - Sedentary strength. Walking and standing required only occasionally. Ability to reach and handle light materials and tools. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in mechanical drafting; or the Technical major sequence.

Suggested Electives - Junior High: Industrial crafts, industrial drawing, electricity, metal, wood, graphic arts. Senior High: technical drafting, general metal, mathematics, science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electro-mechanical Drafting; General Drafting; Machine Design Technology; Mechanical Engineering Technology; Technical Graphics. Also, evening courses.

Adult School - Classes such as machinist, mathematics, mechanical drafting.

Armed Forces - Army: Drafting and Cartography. Air Force: Photomapping. Navy: Draftsman.

ADVANCEMENT AND OUTLOOK

To junior, senior, chief draftsman. May be promoted to a supervisory or managerial position. With additional education, may qualify as a mechanical engineer. With some firms, may become title searcher, estimator, or inspector. In the past, the demand for mechanical draftsmen has been generally greater than for any other category of draftsmen. Prospects are good for continuing expansion.

RELATED AND SPECIALIST OCCUPATIONS

draftsman:

architectural
auto body
electrical
engineering
hydraulic
industrial
marine
structural
tool design

D.O.T.: 0-48.32 TECHNICAL ILLUSTRATOR

Any industry Known also as: production illustrator

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles of scientific thinking: to define problems, collect data, establish facts, and draw valid conclusions; to interpret a variety of technical instructions in books and manuals; to deal with several abstract and concrete variables. Ability to use mathematical procedures involving algebra, geometry, and trigonometry. High: spatial visualization, form perception, finger dexterity, and color discrimination. Average: numerical and verbal aptitudes, clerical perception, motor coordination, and manual dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and precision instruments; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, scientific and technical in nature, carried on in relation to processes, machines, and techniques.

Physical Capacities - Sedentary strength. Walking and standing required only occasionally. Ability to reach and handle drawing materials and small tools. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in mechanical drafting; or the Technical major sequence.

(Turn the page.)

Suggested Electives - Junior High: art, electricity, metal, wood, industrial crafts, industrial drawing. Senior High: architectural, industrial, or mechanical drafting, science illustration, industrial mathematics, senior high art.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: General Drafting; Machine Design Technology; Technical Graphics; Technical Illustration; Tool Engineering Technology. Also, evening courses.

Adult School - A class such as technical illustration.

Armed Forces - Army: Drafting and Cartography. Air Force: Photomapping. Navy: Draftsman.

ADVANCEMENT AND OUTLOOK

"B" to "A" illustrator, leadman, supervisor. May establish a technical illustration services firm. With additional education, may qualify as a mechanical engineer or industrial designer. The field is not overcrowded but opportunities are comparatively limited and restricted to top talent.

RELATED AND SPECIALIST OCCUPATIONS

architectural draftsman
commercial artist, illustrating
letterer
mechanical draftsman
scientific illustrator

D.O.T.: 0-48.41

TOOL DESIGNER

Industry: Aircraft Manufacturing; Manufacturing; Machine Shop

Known also as: development mechanic

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles of scientific thinking: to define problems, collect data, establish facts, and draw valid conclusions; to interpret a variety of technical instructions in books and manuals, to deal with several abstract and concrete variables. Ability to apply mathematical procedures involving algebra, geometry, trigonometry, and calculus. High: numerical aptitude, spatial visualization, and form perception. Average: verbal aptitude, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving the evaluation of information against sensory or judgmental criteria based on knowledge and experience; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for activities of an abstract and creative nature resulting in tangible, productive satisfaction.

Physical Capacities - Light strength. Ability to reach and handle light materials and tools. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal and mechanical drafting.

Suggested Electives - Junior High: Industrial crafts, industrial drawing, electricity, metal, wood. Senior High: mechanical drafting, heavy metal, woodwork, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Technical Graphics; Tool Design; Tool Engineering Technology. Also, evening courses.

Adult School - Classes such as die sinking, machinist, mathematics, mechanical drafting.

Apprenticeship Program - Tool Designer. (4)

Armed Forces - Army: Metalworking. Air Force: Metalworking. Navy: Machinist Mate.

ADVANCEMENT AND OUTLOOK

To tool engineer, production planner, or project engineer. Although the occupation offers relatively few employment openings, long-range prospects are favorable. Tool designers employed by major manufacturing industries engaged in diversified operations are usually assured of stable employment. Such companies manufacture a variety of commercial products and may hold government contracts as well. When one phase of the business declines, they are prepared to shift to another.

RELATED AND SPECIALIST OCCUPATIONS

design checker
die designer
draftsman, tool design
machinist
tool-drawing checker

CAREER GUIDANCE OUTLINES . . .

ELECTRONICS

Airport Control Operator

Computer Systems Serviceman

Electric Motor Repairman

Electrical Appliance Serviceman

Electrical Repairman

Electrician, Airplane

Electronics Technician

Laboratory Assistant, X-Ray Equipment

Lineman

Radio Mechanic, Aircraft Installations

Radio Operator, Air Transportation

Radio Repairman

Systems Testing Laboratory Technician

Telephone Installer

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D.O.T.: 0-61.60

AIRPORT CONTROL OPERATOR

Industry: Air Transportation

Known also as: airport traffic controller, airport control tower operator, control tower radio operator

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: spatial visualization and form perception. Average: Verbal and numerical aptitudes, clerical perception, motor coordination, and finger dexterity.

Temperaments - Situations involving adequate performance under stress when confronted with the critical or unexpected; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for activities resulting in prestige or the esteem of others but nonsocial in nature and carried on in relation to processes, machines, and techniques.

Physical Capacities - Sedentary strength. Ability to reach and handle switches, buttons, and small tools. Talking: imparting oral information clearly and accurately. Hearing: sensitive to sounds and the spoken word. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics; or a Technical major sequence.

Suggested Electives - Junior High: electricity, industrial drawing, public speaking. Senior High: electronics, speech, stagecraft

(Turn the page.)

(audio-visual), radio-speech workshop.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Broadcasting; Broadcasting-Telecasting; Electronics Engineering Aide; Electronics Engineering Technician; Electronics Systems Technician; Intercommunications and Sound. Also, evening courses.

Adult School - Classes such as communications electronics, electronics, mathematics, radio servicing, speech.

Armed Forces - Army: Fixed Station Radio Repair: General Electronics; Radio and Carrier Repair; Radio Code. Air Force: Air Traffic Control and Warning; Communications Operations. Navy: Air Controlman; Communications Technician; Radioman.

ADVANCEMENT AND OUTLOOK

The airport control operator must have two to three years of advance experience in one or a combination of several fields such as flight communications, radar operations, dispatching, and flying. The usual line of promotion is to assistant controller, senior controller, chief controller, to managerial positions. Openings with the Federal Aviation Agency offer avenues for promotion. Anticipated expansion in air traffic should increase the employment opportunities for qualified operators.

RELATED AND SPECIALIST OCCUPATIONS

communication engineer
control room technician
dispatcher
flight radio operator
radio operator
studio engineer
video operator

D.O.T.: 0-66.802

COMPUTER SYSTEMS SERVICEMAN

Any industry

Known also as: digital computer systems serviceman, field engineer, customer engineer, service engineer

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles of logical thinking to define problems, collect data, establish facts, and draw valid conclusions; to interpret a variety of technical instructions; to deal with several abstract and concrete variables. Ability to apply mathematical procedures involving algebra, geometry, and trigonometry. High: numerical aptitude, spatial visualization, form perception, motor coordination, finger and manual dexterities, and color discrimination. Average: Verbal.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, precision instruments, and scales; situations involving the evaluation of information against sensory or judgmental criteria based on knowledge and experience; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, scientific and technical in nature, carried on in relation to processes, machines, and techniques.

Physical Capacities - Light strength. Ability to stand, stoop, and kneel; to reach, feel, and handle parts and tools. Talking: imparting oral information. Hearing: sensitive to sounds. Visual acuity with good accommodation. Color vision. Inside working conditions. Exposure to burns and electrical shock.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics; or a Technical major sequence.

(Turn the page.)

Suggested Electives - Junior High: electricity, metal, industrial drawing. Senior High: algebra, electronics, geometry, industrial drafting, physics, trigonometry.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electronics Engineering Aide; Electronics Engineering Technician; Electronics Systems Technician; Electronics Technician; Electronics Technology. Also, evening courses.

Adult School - Classes such as electronics, semi-conductors, electronic circuits, electronic computer, electronics fundamentals and schematics.

Armed Forces - Army: Air Defense Electronics Maintenance; General Electrical Maintenance; Radio and Television Repair; Surface-to-Air Missile Electronics; Guidance Systems Repair. Air Force: Guided Missile Systems; Intricate Equipment Maintenance. Navy: Aviation Fire Control Technician; Aviation Guided Missileman; Electronics Technician.

ADVANCEMENT AND OUTLOOK

To supervisor of a maintenance crew at a large-scale installation or service manager for an entire district. May advance to a managerial or administrative position or go into sales engineering. Some enter the production process. Rapid expansion for this occupation is predicted.

RELATED AND SPECIALIST OCCUPATIONS

computer laboratory technician
electrical draftsman
electronics engineer
electronics repairman
electronics mechanic
electronics technician
electronics unit assembler
engineering aide
systems testing laboratory technician

D.O.T.: 5-83.433

ELECTRIC MOTOR REPAIRMAN

Any industry

Known also as: electric motor repair electrician, electric shop repairman, motor generator repairman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception and manual dexterity. Average: verbal and numerical aptitudes, spatial visualization, motor coordination, and finger dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to reach and handle tools and equipment. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics.

Suggested Electives - Junior High: electricity, industrial crafts, industrial drawing, metal. Senior High: auto mechanics, general metal, industrial mathematics, industrial science, physics.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electrical Mechanic; Electrical Motor Repair; Electrical Technology. Also, evening courses.

Adult School - Classes such as blueprint reading, electrical theory, mathematics.

Apprenticeship Program - Electrical Repairmen. (3)

Armed Forces - Army: Electrical Equipment Maintenance. Air Force: Atomic Weapons; Training Devices. Navy: Electrician's Mate; Fire Control Technician.

ADVANCEMENT AND OUTLOOK

In large shops, to shop foreman or service manager. For some, advancement comes in the form of pay increases. Forming a partnership or establishing a sales-repair business is another route by which to advance. A long-term trend in the increased use of electrical equipment promises favorable employment prospects. The occupation will probably continue to be affected favorably by the trend toward use of electrical devices in automated manufacturing processes.

RELATED AND SPECIALIST OCCUPATIONS

electric-tool repairman
electrical repairman
electric motor analyst
electric motor assembler and tester

D.O.T.: 5-83.041 ELECTRICAL APPLIANCE SERVICEMA

Any industry

Known also as: appliance service representative
electrical appliances troubleshooter, electrical
household appliance serviceman

PERSONAL REQUIREMENTS

Abilities and Aptitudes: Ability to apply principles to solve practical problems to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception and manual dexterity; Average: verbal and numerical aptitudes, spatial visualization, motor coordination, and finger dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities carried on in relation to processes, machines, and techniques, and involving business contact with people.

Physical Capacities - Medium strength. Ability to stoop and kneel; to reach and handle parts, tools and equipment. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics or heavy metal.

Suggested Electives - Junior High: electricity, metal, industrial crafts, industrial drawing, public speaking. Senior High: auto mechanics, electronics, heavy metal, industrial mathematics, industrial science.

(Turn the page.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electric Motor Controls; Electric Motor Repair; Electronics Technology; Household Applicance Repair. Also, evening courses.

Adult School - Classes such as appliance servicing, blueprint reading, electrical theory, electronics, machinist, mathematics, speech.

Apprenticeship Program - Household Appliance Repairmen. (4)

Armed Forces - Army: Electrical Equipment Maintenance; Utilities. Air Force: Metal Working; Utilities. Navy: Electrician's Mate; Aviation Machinist's Mate; Aviation Electrician's Mate.

ADVANCEMENT AND OUTLOOK

In large shops, to foreman or service manager. The job of field representative for a major manufacturer is possibility. For some, advancement comes in the form of pay increases. Forming a partnership or establishing a sale-service business is another route by which to advance. Locally and nationally, there is a growing need for maintenance electricians who are qualified to install and repair electrical appliances and equipment for the home.

RELATED AND SPECIALIST OCCUPATIONS

electric motor repairman
electrical repairman
electrician
radio television repairman
vending machine serviceman

D.O.T.: 4-97.420

Any industry

ELECTRICAL REPAIRMAN

Known also as: maintenance electrician, repair electrician, electrical trouble man, electrical trouble shooter, wireman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception, motor coordination, and manual dexterity. Average: verbal and numerical aptitudes, spatial visualization, finger dexterity, and eye-hand-foot coordination.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques.

Physical Capacities - Medium strength. Ability to climb, balance, stoop, and kneel; to reach and handle tools and equipment. Visual acuity. Inside working conditions. Hazards involving exposure to electrical shock and falls from scaffolds.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics.

Suggested Electives - Junior High: industrial crafts, industrial drawing, electricity, metal, wood. Senior High: general metal, industrial mathematics, industrial science, physics.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electrical Construction and Maintenance; Electrical Mechanic; Electrical Motor Repair; Electrical Technology; Electrical Wireman. Also, evening courses.

Adult School - Classes such as blueprint reading, electrical theory, mathematics.

Apprenticeship Program - Electrical Repairmen (3); Electrical Wiremen (4)

Armed Forces - Army: Electrical Equipment Maintenance; General Electrical Maintenance. Air Force: Utilities. Navy: Aviation Electrician's Mate; Construction Electrician; Electrician's Mate; Fire Control Technician; Interior Communications Electrician.

ADVANCEMENT AND OUTLOOK

To leadman, maintenance foreman, chief plant electrician, or plant superintendent. May become self-employed as an electrical contractor engaged in estimating and job planning. Expected expansion in electrical power production should result in increased employment opportunities. Automation affects employment favorably, increasing the demand for maintenance and repair of electrical machines and equipment.

RELATED AND SPECIALIST OCCUPATIONS

electric motor repairman
electrical appliance serviceman
electrical mechanic
electrician
elevator repairman
underground repairman
watch electrician
wireman, maintenance

D.O.T.: 4-97.910

ELECTRICIAN, AIRPLANE

Industry: Aircraft Manufacturing

Known also as: electrical and radio assemblyman, electrical wireman, aircraft electrician

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception and manual dexterity. Average: verbal and numerical aptitudes, visualization, and finger dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, wiring diagrams, specifications, and scales; the precise attainment of limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Light strength. Ability to stoop, kneel, crawl, reach and handle small parts and tools. Visual acuity. Inside working conditions. Noise and vibration from operating equipment.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics.

Suggested Electives - Junior High School: electricity, metal, industrial drawing. Senior High School: general metal, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Aeronautical Engineering Technology; Aviation Electricity and Electronics; Electrical Engineering Technology; Electronics Technician. Also, evening courses.

Adult School - Classes such as aeronautics, aircraft blueprint reading, aircraft systems, electricity, electronics, industrial mathematics.

Apprenticeship Program - Electrical and Electronics Development Mechanics (Aircraft). (4)

Armed Forces - Army: Aircraft Maintenance; Field Communications; Fixed Station Radio Repair; Radio and Television Repair. Air Force: Aircraft Accessories Maintenance; Radio-Radar Systems. Navy: Aviation Electronics Technician; Aviation Fire Control Technician; Electronics Technician; Fire Control Technician; Aviation Electricians Mate.

ADVANCEMENT AND OUTLOOK

To leadman, line foreman, inspector, foreman. With the necessary education, may qualify as an electrical engineer. May transfer into electronics or become self-employed in aviation maintenance. The occupation is growing at a moderate rate.

RELATED AND SPECIALIST OCCUPATIONS

automotive electrician
electric motor repairman
electrical repairman
electrician
electronics mechanic
electronics technician
elevator repairman
radio electrician
stage electrician

D.O.T.: 5-83.44

ELECTRONICS TECHNICIAN

Any industry

Known also as: electronic equipment mechanic, electronic maintenance technician, engineering aide, industrial electronics technician, laboratory electrical technician, radio and radar technician, research and development technician, and others.

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to use arithmetic, algebra, and geometry in practical applications. High: form perception and manual dexterity. Average: verbal and numerical aptitudes, spatial visualization, and finger dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, precision instruments, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Light strength. Ability to reach and handle parts and tools. Talking, hearing, visual acuity, and color perception. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics; or a Technical major sequence

Suggested Electives - Junior High: electricity, metal, industrial drawing. Senior High: algebra, electronics, geometry, physics.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electronics: Engineering Aide, Engineering Technician, Systems Technician, Technician, Technology. One-year Curriculum: Electronics Drafting. Also, evening courses.

Adult School - Classes such as electronics, electronic circuits, electronic computer, electronic equipment test and measurement, electronics fundamentals and schematics.

Apprenticeship Programs - Electronics: Industrial, Intercommunication and sound, Radio and TV, Telephone. (4)

Armed Forces - Army: Air Defense Electronics; General Electrical Maintenance; Radio and Television Repair; Surface-to-Air Missile Electronics; Guidance System Repair. Air Force: Guided Missile Systems. Navy: Aviation Electronics Technician; Aviation Guided Missileman; Electronics Technician Sonarman.

ADVANCEMENT AND OUTLOOK

To leadman, to supervisor. With further education may qualify as an electronics engineer. May move into an administrative or sales position. Growth is anticipated in the production of electronic equipment for industrial, commercial, and military use. There will be electronic developments in machine data processing, space communication, bionics, industrial processing, engineering, and automation.

RELATED AND SPECIALIST OCCUPATIONS

digital computer systems serviceman
electric motor repairman
electrical repairman
radio mechanic
systems testing laboratory technician
television repairman

D.O.T.: 0-67.85 LABORATORY ASSISTANT, X-RAY EQUIPMENT

Any industry (No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to logical thinking to define problems, collect data, establish facts, and draw valid conclusions; to interpret a variety of technical instructions; to deal with abstract and concrete variables; to apply mathematical procedures involving algebra, geometry, trigonometry, and calculus. High: numerical aptitude, spatial visualization, and form perception. Average: verbal aptitude, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, laboratory instruments, and scales; and against sensory or judgmental criteria based on knowledge and experience; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for working with processes, machines, or techniques in activities of a scientific and technical nature. An interest in abstract and creative activities concerned with the design of test equipment and the development of new testing techniques.

Physical Capacities - Medium strength. Ability to reach and handle; sensitive touch for making adjustments to test instruments. Near visual acuity. Color vision. Inside working conditions. Hazards in working with high voltage X-ray equipment. Safety precautions are expected.

(Turn the page.)

Laboratory Assistant, X-Ray Equipment
0-67.85

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics; or a Technical major sequence.

Suggested Electives - *Junior High*: electricity, metal, industrial drawing. *Senior High*: Electronics, general metal, mathematics, science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - *Two-year Curriculums*: Electro-Mechanical Drafting; Electronic Design Drawing; Electronics: Engineering Aide, Engineering Technician, Technician, Technology; X-ray Technology. *One-year Curriculum*: Electronics Drafting.

Adult School - Classes such as basic electricity, electronic fundamentals and schematics, industrial electronic equipment.

Armed Forces - *Army*: Air Defense Electronics Maintenance; Medical Laboratory; Metalworking; Surface-to-Air Missile Electronics; Guidance System Repair. *Air Force*: Guided Missile Systems; Medical; Metalworking. *Navy*: Aviation Electronics Technician; Aviation Guided Missileman; Dental Technician; Electronic Technician.

ADVANCEMENT AND OUTLOOK

To supervisor or into management. With the necessary education, may qualify as an electrical engineer. Growth is anticipated in the use of X-ray equipment for industrial, commercial, space, and military needs.

RELATED AND SPECIALIST OCCUPATIONS

electrical repairman
electro-mechanical draftsman
electronics technician
electronics unit assembler
engineering aide
laboratory technician, development

D.O.T.: 5-53.410 - 5-53.420

LINEMAN

Industry: Telephone and Telegraph;
Light, Heat, and Power

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception, manual dexterity, and eye-hand-foot coordination. Average: verbal and numerical aptitudes, spatial visualization, motor coordination, and finger dexterity.

Temperaments - Situations involving adequate performance under stress when confronted with the critical or unexpected; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for activities of a scientific and technical nature which result in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to climb and balance; to reach and handle parts and tools. Visual acuity. Outside working conditions. Hazards involving exposure to electrical shock and falls from high places.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics.

Suggested Electives - Junior High: industrial crafts, industrial drawing, electricity, metal. Senior High: industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electrical Engineering Technology; Electrical Technology; Electronics Engineering Aide; Electronics Engineering Technician; Electronics Technology; Telephone P.B.X. (Private Branch Exchange). Also, evening courses.

Adult School - Classes such as blueprint reading, electrical theory, mathematics.

Apprenticeship Program - Electrical Lineman for Power Distribution. (3)

Armed Force - Army: Field Communications; Telephone Inside Plant Maintenance; and Telephone Outside Plant Maintenance. Air Force: Wire Maintenance. Navy: Communications Technician.

ADVANCEMENT AND OUTLOOK

To line foreman. With additional training, may move into more difficult assignments. Cross-training (switching workers from one job to another) provides additional advancement opportunities. Employment is expected to increase moderately. Replacement needs will provide most of the job openings for new workers.

RELATED AND SPECIALIST OCCUPATIONS

cable splicer
central office installer
central office repairman
power transmission lineman
street lighting lineman
street railway lineman
telephone installer
transmission engineer

D.O.T.: 5-83.447

RADIO MECHANIC, AIRCRAFT INSTALLATIONS

Industry: Air Transportation; Aircraft Manufacturing

Known also as: airplane radio tester, maintenance man, broadcast; radio equipment installer, radio repairman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception and manual dexterity. Average: verbal and numerical aptitudes, spatial visualization, and motor coordination.

Temperaments - Situations involving a variety of duties and frequent change; the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Light strength. Ability to stoop and kneel; to reach and handle small parts and tools. Talking: imparting oral information. Hearing: sensitive to sounds. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics.

Suggested Electives - Junior High: electricity, metal, industrial drawing. Senior High: industrial mathematics, industrial science, light metal, general metal.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Aviation Electricity and Electronics; Electronics Engineering Technician; Electronics Technology; Radio Communications. Also, evening courses.

Adult School - Classes such as aircraft blueprint reading, electrical theory, electronics, industrial mathematics.

Apprenticeship Programs - Electrical and Electronic Development Mechanics (Aircraft); Radio and TV Electronics; Intercommunication and Sound Electronics. (4)

Armed Forces - Army: Air Defense Electronics Maintenance; Field Communications; Fixed Station Radio Repair; Guidance Systems Repair; Radio and Carrier Repair; Surface-to-Air Missile Electronics. Air Force: Atomic Weapons; Radio-Radar Systems; Training Devices. Navy: Aviation Electronics Technician; Aviation Guided Missileman; Fire Control Technician; Radioman.

ADVANCEMENT AND OUTLOOK

To leadman, line foreman, inspector, shop foreman. With the necessary education, may move into an engineering or managerial position. May establish his own business in radio sales and repair. May move into the related field of electronics which promises increasing employment opportunities. A substantial increase of radio mechanics is expected in aircraft manufacturing and a moderate increase in the air transportation industry.

RELATED AND SPECIALIST OCCUPATIONS

automobile radioman
electronics technician
radio electrician
radio-equipment installer
radio repairman
rigger, radio

D.O.T.: 0-61.33 RADIO OPERATOR, AIR TRANSPORTATION

Industry: Air Transportation; Telephone and Telegraph; Water Transportation

Known also as: radio officer; radiotelephone radioman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, or diagram form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: verbal aptitude. Average: numerical aptitude, spatial visualization, form perception, clerical perception, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques.

Physical Capacities - Sedentary strength. Ability to reach and handle small tools and equipment. Talking: imparting oral information clearly and accurately. Hearing: listening and receiving information through spoken communication. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with Industrial Occupations major in electronics.

Suggested Electives - Junior High: electricity, sound and stagecraft, typewriting. Senior High: industrial mathematics, industrial science, typewriting.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Broadcasting; Broad-

(Turn the page.)

casting-Telecasting; Electronics Engineering Aide; Electronics Engineering Technician; Electronics Technology; Radio Communications. Also, evening courses.

Adult School - Classes such as communications electronics, electronics, mathematics, radio-servicing, speech, typewriting.

Apprenticeship Programs - Electronics: Intercommunication and Sound, Radio and TV. (4)

Armed Forces - Army: Fixed Station Radio Repair; General Electronics; Radio and Carrier Repair; Radio Code. Air Force: Intelligence; Communications Operations. Navy: Radarman; Radioman.

ADVANCEMENT AND OUTLOOK

Third to second, to first class radio operator according to type of Federal Communications Commission (F.C.C.) license and experience. May transfer into a higher paying job, e.g., airline dispatcher; or, traffic controller for the Federal Aviation Agency (F.A.A.). May go into commercial radio or television. With the necessary education, may advance to an engineering or managerial position. May establish his own business in radio sales and repair. A substantial increase is anticipated in the number of radio operators as control facilities are expanded to handle increased air traffic.

RELATED AND SPECIALIST OCCUPATIONS

airline radio operator
audio operator
control room man
photoradio operator
radio patrolman
radio operator, broadcasting
radio operator, flight
radio operator, police
video operator
wireless operator

D.O.T.: 5-83.411

Any industry

RADIO REPAIRMAN

Known also as: radio mechanic, serviceman or technician; radiotrician, radio trouble shooter

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception and manual dexterity. Average: verbal and numerical aptitudes, motor coordination, and finger dexterity.

Temperaments - Situations involving a variety of duties and frequent change; the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales.

Physical Capacities - Medium strength. Ability to reach and handle tools, parts, and equipment. Talking: imparting oral information accurately. Hearing: sensitive to sounds and the spoken word. Visual acuity. Color vision. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics.

Suggested Electives - Junior High: electricity, metal, industrial drawing. Senior High: general metal, industrial mathematics, industrial science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electrical Mechanic; Electronic Design

(Turn the page.)

Drafting; Electronics Engineering Aide; Electronics Engineering Technician; Electronics Systems Technician; Electronics Technology; Radio Communications; Radio and Television. One-year Curriculum: Electronics Drafting. Also, evening courses.

Adult School - Classes such as electronics, electrical theory, industrial mathematics.

Apprenticeship Programs - Electronics: Intercommunication and Sound; or Radio and Television. (4)

Armed Forces - Army: Air Defense Electronics Maintenance; Field Communications; Fixed Station Radio Repair; Guided Systems Repair; Radio and Carrier Repair; Radio and Television Repair. Air Force: Atomic Weapons; Radio-Radar Systems. Navy: Electronics Technician; Fire Control Technician; Guided Missileman; Radioman.

ADVANCEMENT AND OUTLOOK

In manufacturing and large service companies to leadman, line foreman, inspector, foreman. With the necessary education, may move into an engineering or managerial position. May establish his own business in radio sales and repair. May move into the related field of electronics which is growing rapidly. Employment is increasing moderately for radio repairmen.

RELATED AND SPECIALIST OCCUPATIONS

computer systems serviceman
electrician, radio
laboratory assistant, X-ray equipment
public address serviceman
radio equipment installer
radio mechanic, aircraft installations
radio serviceman, police
radio-television repairman
rigger, radio
transmitter repairman
X-ray equipment tester

D.O.T.: 0-67.16

SYSTEMS TESTING LABORATORY TECHNICIAN

Industry: Electrical and Electronics Equipment; Systems Development

Known also as: electrical and electronics development mechanic, electrical engineering aide, electrical laboratory technician, electronic engineering technician, and others.

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles of scientific thinking: to define problems, collect data, establish facts, and draw valid conclusions; to interpret technical instructions; to deal with abstract and concrete variables; to apply mathematical procedures involving algebra, geometry, and trigonometry. High: verbal and numerical aptitudes, spatial visualization, form perception, motor coordination, finger and manual dexterities, color discrimination.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, precision instruments, and scales; a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, scientific and technical in nature, carried on in relation to processes, machines, and techniques. An interest in abstract and creative activities involved in the design of complex electronic test instruments.

Physical Capacities - Medium strength. Ability to reach and handle; sensitive touch for making adjustments to instruments. Hearing: sensitive to fine discriminations in sound. Visual acuity. Inside working conditions. Hazards involving exposure to electrical shock and burns.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics; or a Technical major sequence.

(Turn the page.)

Suggested Electives - Junior High: electricity, metal, industrial drawing. Senior High: algebra, general metal, geometry, industrial mathematics, physics, trigonometry.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electronics: Engineering Aide, Engineering Technician, Systems Technician. One-year Curriculum: Electronics Drafting. Also, evening courses.

Adult School - Classes such as electronic computer programming, electronic equipment test and measurement, electronic fundamentals and schematics.

Apprenticeship Programs - Electronics; Industrial, Intercommunication and Sound, Radio and Television, Telephone. (4)

Armed Forces - Army: Air Defense Electronics Maintenance; General Electrical Maintenance; Radio and Television Repair; Electronics Guidance System Repair. Air Force: Guided Missile Systems. Navy: Aviation Electronics Technician; Aviation Guided Missileman; Electronics Technician Sonarman.

ADVANCEMENT AND OUTLOOK

To supervisor or into management. With the necessary education may qualify as an electronics engineer. Growth is anitcipated in the production of electronic equipment for industrial, commercial, space, and military use.

RELATED AND SPECIALIST OCCUPATIONS

computer laboratory technician
development instrumentation technician (aircraft)
electronics technician, nuclear reactor
research technician, environmental test
technical writer, electronic service publications

D.O.T.: 5-53.030 TELEPHONE INSTALLER

Industry: Telephone and Telegraph Known also as: station installer

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to understand and apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. Average: verbal and numerical aptitudes, spatial visualization, form perception, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving repetitive operations carried out according to set procedures or sequences; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through activities resulting in tangible, productive satisfaction.

Physical Capacities - Ability to reach and handle parts and tools. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in electronics.

Suggested Electives - Junior High: industrial crafts, industrial drawing, electricity, metal. Senior High: architectural drafting, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electrical Engineering Technology; Electrical Technology; Electronics Engineering Aide; Electronics Engineering Technician; Electronics Technician; Electronics Technology; and Telephone Private Branch Exchange (P.B.X.). Also, evening courses.

Adult School - Classes such as basic electricity, electrical wiring and code, telephone maintenance.

Apprenticeship Program - Telephone Electronics. (4)

Armed Forces - Army: Field Communications; Telephone Inside Plant Maintenance; Telephone Outside Plant Maintenance. Air Force: Wire Maintenance. Navy: Communications Technician.

ADVANCEMENT AND OUTLOOK

To P.B.X. installer or P.B.X. repairman. With the necessary education, may qualify as an electronics engineer. Managerial positions may be reached from this occupation. Employment of telephone installers and repairmen is expected to increase steadily. The number of telephones in use is expected to grow at an annual rate of about 5 per cent during the 60's. Also, there will be replacement and repair needs due to the mobility of the population. Transfers, deaths, and retirements will provide additional openings.

RELATED AND SPECIALIST OCCUPATIONS

cable splicer
central office installer
central office repairman
lineman
station repairman
telegraph installer
transmission engineer

CAREER GUIDANCE OUTLINES . . .

GRAPHIC ARTS

- Bookbinder
- Compositor
- Cylinder Press Man
- Linotype Operator
- Offset Press Man
- Photoengraver
- Vari-Typist

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D.O.T.: 4-49.010 **BOOKBINDER**

Industry: Printing and Publishing Known also as: binder

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra and geometry in practical applications. Average: spatial visualization, form perception, motor coordination, finger and manual dexterities, and color discrimination.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Light, sedentary strength. Ability to reach and handle small tools and materials. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in graphic arts.

Suggested Electives - Junior High: art, graphic arts, industrial crafts. Senior High: art, graphic arts, industrial crafts, woodworking.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Bindery; Book and Pamphlet Binding. Also, evening courses.

Adult School - Classes such as art, printing.

Apprenticeship Program - Binderymen. (5)

Armed Forces - Army and Air Force: Printing. Navy: None.

ADVANCEMENT AND OUTLOOK

To foreman or shop superintendent. With the necessary captial for equipment, may become a self-employed businessman. Employment opportunities should hold steady with openings dependent primarily on replacement needs. More women than men work in this and related bindery occupations. There is considerable turnover from year to year. Bookbinding operations are almost completely mechanized and the demand for fine hand bookbinding is strictly limited.

RELATED AND SPECIALIST OCCUPATIONS

book finisher
embosser
hand bookbinder
marbler
presser
stitcher

D.O.T.: 4-44.010 **COMPOSITOR**

Industry: Printing and Publishing

Known also as: hand compositor, typesetter, typographer, printer

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception and finger dexterity. Average: verbal aptitude, spatial visualization, clerical perception, motor coordination, and manual dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits or tolerances.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Light strength. Ability to reach and handle light materials. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in graphic arts.

Suggested Electives - Junior High: industrial crafts, industrial drawing, graphic arts. Senior High: art, drafting, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Advertising and Graphic Arts; Letterpress; Linotype Keyboard Operation; Linotype Machinist; Lithography; Machinist-Operator; Photo Offset; Printing - Hand Composition; Printing Management; Printing Technology. Also, evening courses.

Adult School - Classes such as English, Mathematics, offset lithography, printing.

Apprenticeship Program - Printing Compositor. (6)

Armed Forces - Army and Air Force: Printing. Navy: Lithographer.

ADVANCEMENT AND OUTLOOK

To composing room foreman and with managerial ability, to executive work. An ability to estimate printing costs can lead to a supervisory or managerial position. Additional opportunities are available in purchasing and sales. May establish his own printing firm. The volume of printing is expected to increase during the 1960s but openings for compositor will depend primarily on replacement needs cause by death and retirement.

RELATED AND SPECIALIST OCCUPATIONS

casting machine operator
composing machine operator
monotype keyboard operator
photo compositor
proofreader
teletype operator
type caster

D.O.T.: 4-48.010

CYLINDER PRESS MAN

Industry: Printing and Publishing

Known also as: cylinder press operator and flat bed press operator

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception and color discrimination. Average: spatial visualization, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques. Talking, hearing, and visual acuity. Inside working conditions. Noise and vibration from operating machines.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in graphic arts.

Suggested Electives - Junior High: graphic arts; general metal. Senior High: art, graphic arts, industrial mathematics, industrial science, metal.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Letterpress; Lithography; Offset Presswork; Printing - Presswork. Also, evening courses.

Adult School - Classes such as, offset lithography, and printing.

Armed Forces - Army and Air Force: Printing. Navy: Lithographer.

ADVANCEMENT AND OUTLOOK

To foreman, to shop superintendent. Additional possibilities for advancement are in purchasing and sales. May establish his own printing firm. Growth in population and the expansion of industry have increased the demand for printing of all kinds. Opportunities for press men are expected to increase considerably.

RELATED AND SPECIALIST OCCUPATIONS

lithographic press man

offset press man

D.O.T.: 4-44.110

LINOTYPE OPERATOR

Industry: Printing and Publishing

Known also as: composing machine operator

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception and clerical perception. Average: verbal and numerical aptitudes, spatial visualization, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits or tolerances.

Interests - Preference for activities concerned with people and the communication of ideas but nonsocial in nature and carried on in relation to processes, machine and techniques.

Physical Capacities - Sedentary strength. Ability to reach and handle light materials. Visual acuity. Inside working conditions. Noise and vibration from operating machines and equipment.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in graphic arts.

Suggested Electives - Junior High: graphic arts, metal. Senior High: graphic arts, industrial mathematics, industrial science, typewriting.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Linotype Keyboard Operation; Linotype Machinist; Printing - Hand Composition, Printing Technology. Also, evening courses.

Adult School - Classes such as printing and publication art.

Apptenticeship Program - Compositor. (6)

Armed Forces - Army and Air Force: Printing. Navy: Lithographer.

ADVANCEMENT AND OUTLOOK

To composing room foreman, to shop superintendent. However, such advancement is limited. The incentive for seeking the job of linotype operator lies in the relative freedom from supervision. With additional education, may move into a supervisory or managerial position. May establish his own printing firm. Qualified operators are currently in short supply.

RELATED AND SPECIALIST OCCUPATIONS

cameraman
casting-machine operator
compositor and/or new process man
monotype keyboard operator
stripper
typesetter and caster

D.O.T.: 4-48.050 **OFFSET PRESS MAN**

Industry: Printing and Publishing

Known also as: offset press operator; lithograph press man

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception. Average: verbal and numerical aptitudes, spatial visualization, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques.

Physical Capacities - Medium strength. Ability to reach and handle materials, levers, and tools. Visual acuity. Inside working conditions. Noise and vibration from operating machines.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in graphic arts.

Suggested Electives - Junior High: graphic arts, industrial drawing. Senior High: art, industrial mathematics, industrial science, photography.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Lithography; Offset Presswork; Photo Offset; Printing; Printing - Presswork, Printing Technology. Also, evening courses.

Adult School - Classes such as art, offset lithography, printing.

Apprenticeship Program - Press Man. (6)

Armed Forces - Army and Air Force: Printing. Navy: Lithographer.

ADVANCEMENT AND OUTLOOK

To foreman, to shop superintendent. Purchasing and sales offer additional possibilities for advancement. May establish his own print shop. Offset printing should continue to grow at a rapid rate because of the increasing use of photographs, drawings, and illustrations in printed matter; also, because of a trend toward the use of color in many printed products.

RELATED AND SPECIALIST OCCUPATIONS

cylinder press man
photocomposing machine operator
photoengraver
photoengraving printer
plate finisher
stripper
web pressman

D.O.T.: 4-47.100 **PHOTOENGRAVER**

Industry: Printing and Publishing Known also as: engraving operator

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception, motor coordination, and finger and manual dexterities. Average: verbal and numerical aptitudes and spatial visualization.

Temperaments - Situations involving the evaluation of information against sensory or judgmental criteria based on knowledge and experience; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Light strength. Ability to reach and handle materials. Visual acuity, including color perception. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in graphic arts.

Suggested Electives - Junior High: art, metal, graphic arts, industrial crafts. Senior High: senior high art, graphic arts, advertising photography.

(Turn the page.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Advertising and Graphic Arts; Letterpress; Lithography; Offset Presswork; Photo Offset; Printing - Hand Composition; Printing - Presswork; Printing Technology. Also, evening courses.

Adult School - Classes such as art, offset lithography, photography, printing.

Apprenticeship Program - Although an apprenticeable occupation, there is no formalized apprenticeship program for photoengraver in the Los Angeles area. Related apprenticeship programs in printing include: Compositor (6), Lithographer (6), or Pressman. (6)

Armed Forces - Army and Air Force: Printing. Navy: Lithographer.

ADVANCEMENT AND OUTLOOK

To foreman, to shop superintendent. Purchasing and sales offer additional possibilities for advancement. May establish his own print shop. A small increase in the number of openings for photengravers is anticipated for the 1960s. For the most part, employment opportunities will depend upon replacement needs.

RELATED AND SPECIALIST OCCUPATIONS

- ben day artist
- etcher, photoengraving
- finisher, photoengraving
- offset press man
- photographer, photoengraving
- plate finisher
- proofer, photoengraving
- rotogravure press man
- sterotyper
- stripper

D.O.T.: 1-37.38 VARI-TYPIST

Any industry (No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out instructions in written, oral, or diagram form; to deal with problems involving several concrete variables; to use arithmetic involving fractions, decimals and percentages. High: form perception, clerical perception, motor coordination, and finger dexterity. Average: verbal aptitude and manual dexterity.

Temperaments - Situations involving repetitive or short-cycle operation carried out according to set procedures or sequences; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for activities of a routine, concrete, organized nature which are concerned with people and the communication of ideas.

Physical Capacities - Light strength. Ability to reach and handle light materials. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with a General Office major and graphic arts electives; or an Industrial Occupations major in graphic arts with typing electives.

Suggested Electives - Junior High: art, graphic arts, industrial drawing, typing. Senior High: art, graphic arts, industrial drafting, typing.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Advertising Art; Advertising and Graphic Arts; General Clerical; General Secretarial; Office Machines. One-year Curriculums: Clerical; Secretarial Science. Also, evening courses.

Adult School - Classes such as offset lithography and typewriting.

Armed Forces - Army: Administration; Clerical; Communications Center Operations; Data Processing; Finance; Military Intelligence; Supply. Air Force: Administration. Navy: Administrative and Clerical.

ADVANCEMENT AND OUTLOOK

Progressively to more complex assignments with an increase in salary. With training in drafting, may progress to forms designer or forms control man. The vari-type machine is a substitute for typesetting and can fill certain printing needs more economically than the letterpress. Competent vari-type operators are in short supply and long-range prospects are favorable.

RELATED AND SPECIALIST OCCUPATIONS

multiplex-machine operator
radio-news copyman
statistical typist
telegraphic typewriter operator
teletypesetter operator
typist

CAREER GUIDANCE OUTLINES . . .

INDUSTRIAL CRAFTS

Analytical Research Technician
(Resins and Adhesives)

Camera Repairman

Compression Molding Machine
Operator, (Plastics)

Lathe Hand, Automatic (Plastics)

Leather Worker

Optician

Shoe Repairman

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D.O.T.: 0-67.81

ANALYTICAL RESEARCH TECHNICIAN
(Resins and Adhesives)

Industry: Plastics Materials

Known also as: special adhesive technician or technical plastic specialist

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles of scientific thinking: to define problems, collect data, establish facts and draw valid conclusions; to interpret a variety of technical instructions; to deal with several abstract and concrete variables. Ability to apply mathematical procedures involving algebra, geometry, and trigonometry. High: numerical aptitude, spatial visualization, and form perception. Average: verbal aptitude, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, laboratory apparatus, and scales; also, against sensory or judgmental criteria based on knowledge and experience; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for working with techniques, methods, and procedures in activities of a scientific and technical nature. An interest in abstract and creative activities concerned with the design of test equipment and the development of new testing techniques.

Physical Capacities - Medium strength. Ability to reach, to handle, to feel with the fingers in manipulating controls and in making adjustments to apparatus and equipment. Visual acuity and color vision. Inside working conditions. Hazards in working with chemicals. Appropriate safety precautions are expected.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with a Technical or an Industrial Technology major; or an Industrial Occupations major in industrial crafts and woodwork.

Suggested Electives - Junior High: electricity, metal, wood, industrial crafts, industrial drawing. Senior High: algebra, chemistry, geometry, heavy metal, industrial science, light metal, industrial crafts, trigonometry.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculum: Plastics Technician. Also, evening courses.

Adult School - Classes such as thermosetting plastics and thermoplastic plastics.

Armed Forces - Army: Metalworking. Air Force: Fabric, Leather, and Rubber; Metalworking. Navy: Aviation Structural Mechanic; Molder; Patternmaker; Shipfitter.

ADVANCEMENT AND OUTLOOK

To supervisor. May go into management. With the necessary education, may qualify as a chemical engineer. The use of plastics and adhesives by industry and the military is expected to increase. The nation's space program should also stimulate employment in this field.

RELATED AND SPECIALIST OCCUPATIONS

ceramics analyst
chemical technology technician, radiation
development reactor technician, test apparatus
laboratory assistant, X-ray equipment
research laboratory analyst

D.O.T.: 5-83.901

CAMERA REPAIRMAN

Any industry

Known also as: camera machinist, camera maintenance man, motion picture camera repariman, motion picture equipment repairman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception, motor coordination, and manual dexterity. Average: spatial visualization and finger dexterity.

Temperaments - Situations involving the performance of tasks under specific instruction with little latitude for independent action or judgment; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Sedentary strength. Ability to reach and handle small tools and parts. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Technology major or an Industrial Occupations major in metal.

Suggested Electives - Junior High: electricity, metal, industrial crafts, industrial drawing. Senior High: electronics, industrial mathematics, industrial science, photography, physics.

(Turn the page.)

Camera Repairman
5-83.901

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculum: Machine Shop. Also, evening courses.

Adult School - Classes such as electronics, mathematics, photography, science.

Armed Forces - Army: General Precision Maintenance. Air Force: Intricate Equipment Maintenance. Navy: Photographer's Mate.

Apprenticeship Program - A related program for Machinist is available. (4)

ADVANCEMENT AND OUTLOOK

No defined lines of promotion. A maturing skill is often recognized by progressive salary raises or assignment to a more difficult job. May move into sales or production work; or establish a camera sales and repair business. The photographic industry is growing rapidly. Technical advancement in camera construction should contribute to a demand for the camera repariman.

RELATED AND SPECIALIST OCCUPATIONS

camera assembler
cameraman
camera clerk
film laboratory equipment mechanic
instrument maker
instrument repairman
photographer
projector assembler

D.O.T.: 7-10.014

COMPRESSION MOLDING MACHINE OPERATOR (Plastics)

Industry: Fabricated Plastics Products

Known also as: hydraulic press operator, molder operator, mold setter, plunger operator

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out detailed but uninvolved written or oral instructions; to deal with problems involving a few concrete variables; to use arithmetic to add, subtract, multiply, and divide whole numbers. Average: form perception.

Temperaments - Situations involving repetitive or short-cycle operations carried out according to set procedures or sequences; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities of a routine, concrete, organized nature carried on in relation to processes, machines, and techniques.

Physical Capacities - Light strength. Ability to reach and handle small parts and tools. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in industrial crafts.

Suggested Electives - Junior High: industrial crafts, industrial drawing, metal, wood. Senior High: ceramics, heavy metal, general metal, industrial mathematics, industrial science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculum: Plastics Technician. Also, evening courses.

(Turn the page.)

Adult School - Classes such as thermoplastic plastics and thermosetting.

Armed Forces - Army: Metalworking. Air Force: Metalworking. Navy: Machinist's Mate; Molder.

ADVANCEMENT AND OUTLOOK

To foreman, to plant foreman. May open his own shop. With the necessary education and experience, may go into sales or engineering. During the 1960's, employment in fabricated plastics is expected to increase at a faster rate than the over-all increase in employment which is estimated as a 20 per cent increase for the nation's total working population. A high level of activity will probably continue in automobile, aircraft, electronics, and other industries which use plastics products.

RELATED AND SPECIALIST OCCUPATIONS

coater
extruder operator
injection molding machine operator
laminating press operator
tumbler operator

D.O.T.: 7-10.222 LATHE HAND, AUTOMATIC, (Plastics)

Industry: Fabricated Plastics Products (No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out instructions in written, oral, or schedule form; to deal with problems involving several concrete variables; to use arithmetic involving fractions, decimals, and percentages. Average: spatial visualization, form perception, and manual dexterity.

Temperaments - Situations involving repetitive or short-cycle operations carried out according to set procedures or sequences; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Light strength. Ability to reach and handle small parts and tools. Talking: imparting oral information. Hearing: listening and receiving oral information. Visual acuity. Inside working conditions. Noise and vibration. Exposure to fumes, odors, and toxic conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in industrial crafts.

Suggested Electives - Junior High: metal, wood, industrial crafts, industrial drawing. Senior High: heavy metal, general metal, ceramics, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculum: Plastics Technician. Also, evening courses.

Adult School - Classes such as thermosetting plastics and thermoplastic plastics.

Armed Forces - Army: Metalworking. Air Force: Metalworking. Navy: Shipfitter.

ADVANCEMENT AND OUTLOOK

To foreman, to plant foreman. May open his own shop. With the necessary education and experience, may go into sales or engineering. During the 1960's employment in fabricated plastics is expected to increase at a faster rate than the over-all increase in employment which is estimated as a 20 per cent increase for the nation's total working population. A high level of activity will probably continue in the automobile, aircraft, electronics, and other industries which use plastic products.

RELATED AND SPECIALIST OCCUPATIONS

ceramics lathe operator
compression molding machine operator
extruder operator
injection molding machine operator
laminating press operator
machinist
mandrel maker
mold setter
variety lathe operator

D.O.T.: 6-62.150 and 6-62.160

LEATHER WORKER

Industry: Automobile Manufacturing;
Leather Products

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out detailed but uninvolved written or oral instructions; to deal with problems involving a few concrete variables; to use arithmetic to add, subtract, multiply, and divide whole numbers. Average: form perception, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible productive satisfaction.

Physical Capacities - Light strength. Ability to reach and handle small tools and light materials. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in Industrial Crafts.

Suggested Electives - Junior High: industrial crafts, industrial drawing, metal, wood. Senior High: industrial mathematics, upholstery.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculum: Crafts. Also, evening courses.

Adult School - Classes such as creative design and industrial mathematics.

(Turn the page.)

Apprenticeship Program - A formal program is not offered in the Los Angeles area. When available, the apprenticeship for leather worker requires three to four years of on-the-job training combined with related classroom instruction. On-the-job training may be obtained in some leather-working establishments.

Armed Forces - Army: Quartermaster Equipment Maintenance. Air Force: Fabric, Leather, and Rubber. Navy: Ship's Serviceman.

ADVANCEMENT AND OUTLOOK

Promotion to foreman may occur in a large industry. Opportunities are available in the related and specialist occupations (see below). May open a leather-craft and repair shop. Continuing population growth and the establishment of suburban shopping centers should result in the opening of additional leather-craft shops.

RELATED AND SPECIALIST OCCUPATIONS

boot and shoe maker
case coverer
case maker
cutter-patternmaker
harness maker
leather dresser
leather grader

orthopedic-prosthetic technician
orthopedic shoe builder (pedo-practor)
sewing machine operator
shoe repairman
tuber

D.O.T.: 5-08.010 **OPTICIAN**

Industry: Optical Goods Known also as: optical mechanic

PERSONAL REQUIREMENTS

Abilities and Abilities - Ability to apply principles to solve practical problems; to interpret a variety of instructions furnished in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: numerical aptitude, form perception, motor coordination, and finger dexterity; Average: verbal aptitude, spatial visualization, and manual dexterity.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for activities of a scientific and technical nature that result in tangible, productive satisfaction.

Physical Capacities - Sedentary strength. Ability to reach and handle light materials. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in general metal; or the Technical major sequence.

Suggested Electives - Junior High: industrial crafts, drafting, metal, wood. Senior High: industrial crafts, mathematics, photography, physics.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculum: Ophthalmic Optics. Also, evening courses.

(Turn the page.)

Adult School - Classes such as English, mathematics, physics, speech, sales.

Armed Forces - Army: Precision Maintenance, General. Air Force: Intricate Equipment Maintenance. Navy: Optical Man; Instrument Man.

ADVANCEMENT AND OUTLOOK

To foreman or shop superintendent. May go into sales. A growing amount of prescription lens work has led in the past to a steady increase in employment opportunities. The trend is expected to continue.

RELATED AND SPECIALIST OCCUPATIONS

- beveler
- dispensing optician
- dotter
- instrument maker
- lens mounter
- optical glass silverer
- optical instrument inspector
- precision lens grinder
- precision lens polisher
- prism measurer

D.O.T.: 4-60.100

SHOE REPAIRMAN

Industry: Personal Services

Known also as: Benchman, shoemaker, shoe repairer

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out detailed but uninvolved written or oral instructions; to deal with problems involving a few concrete variables; to use arithmetic to add, subtract, multiply, and divide whole numbers. High: manual dexterity. Average: numerical aptitude, form perception, motor coordination, finger dexterity, and color discrimination.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through activities resulting in tangible, productive satisfaction.

Physical Capacities - Light strength. Ability to reach and handle materials and small tools. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in industrial crafts.

Suggested Electives - Junior High: metal, wood, industrial crafts, industrial drawing. Senior High: upholstery, industrial math, industrial science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculum: Crafts. Also, evening courses

(Turn the page.)

Adult School - A class such as industrial mathematics.

Apprenticeship Program - A formal program is not offered in the Los Angeles area. When available, the apprenticeship for shoe repairman requires two to three years of on-the-job training combined with related classroom instruction. On-the-job training may be obtained in some shoe repair shops.

Armed Forces - **Army**: Quartermaster Equipment Maintenance. **Air Force**: Fabric, Leather, and Rubber. **Navy**: Ship's Serviceman.

ADVANCEMENT AND OUTLOOK

Promotion to foreman may occur in a large shop. Opportunities are available in the related and specialist occupations (see below). May establish his own shoe repair business. Continuing population growth and establishment of suburban shopping centers should result in the opening of additional shoe repair shops.

RELATED AND SPECIALIST OCCUPATIONS

- boot and shoe maker
- leather cutter
- leather worker
- orthopedic shoe builder (pedo-practor)
- orthopedic shoe repairman
- shoe repair finisher
- shoe repair stitcher
- sole conforming machine operator

CAREER GUIDANCE OUTLINES . . .

METAL

Automobile Body Repairman, Metal

Combination Welder

Form Builder

Heater

Instrument Maker

Ironworker, Shop

Machine-Tool Operator

Machinist

Melter

Millwright

Office Machines Serviceman

Patternmaker, Metal

Plumber

Refrigeration Mechanic

Sheet Metal Worker

Structural Steel Worker

Tool and Die Maker

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D.O.T.: 5-81.510

AUTOMOBILE BODY REPAIRMAN, METAL

Industry: Automobile Manufacturing; Automotive Services

Known also as: automobile body worker, automobile collision serviceman, bodyline finisher, bumper, dent remover, fender and body repairman, hammer-out man, metal worker

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. Average: form perception, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving the evaluation of information against sensory or judgmental criteria based on knowledge and experience; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through activities resulting in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to stoop, kneel, reach, lift; to push and pull wrenches, to hold and swing hammers, to handle small to large parts. Visual acuity. Inside working conditions. Noise and vibration from hammers and operating equipment.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in auto mechanics.

Suggested Electives - Junior High: metal, industrial crafts, industrial drafting. Senior High: general metal, light metal, industrial crafts, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Autobody and Fender; Sheet Metal Work. Also, evening courses.

Adult School - Classes such as autobody and fender repair, sheet metal, welding.

Apprenticeship Program - Automobile Body Repairman. (4)

Armed Forces - Army: Metalworking. Air Force: Metalworking. Navy: Metalsmith.

ADVANCEMENT AND OUTLOOK

To foreman, to shop manager. May open his own autobody and fender repair shop; or transfer into related fields such as welding, sheet metal, or design. There are opportunities also in automotive engineering, design, and automobile manufacturing. The increase in automobile registrations, the use of lighter gauge metal in automobile bodies, and the use of flaring body styles have increased the demand for auto body reparimen. Openings are expected to increase for some time ahead. To be considered, however, is the probability that skills and techniques may need to be modified as new materials are introduced. Plastics, for example, is already being used in auto body design.

RELATED AND SPECIALIST OCCUPATIONS

custom body builder, metal
sheet metal man
welder

D.O.T.: 4-85.040

Any industry

COMBINATION WELDER

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out instructions in written, oral, or diagram form; to deal with problems involving several concrete variables; to use arithmetic involving fractions, decimals, and percentages. Average: verbal and numerical aptitudes, spatial visualization, form perception, and manual dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects in activities that result in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to climb. balance, stoop and kneel; to reach and handle small to large parts and meterials. Visual acuity. Both inside and outside working conditions. Extremes of heat plus temperature changes. Hazards involving exposure to heat and burns. Wears protective glasses or face shield while welding.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

Suggested Electives - Junior High: electricity, metal, industrial drawing. Senior High: electronics, industrial mathematics, industrial science, mechanical drafting.

(Turn the page

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Gas and Electric Welding; Industrial Welding. Also, evening courses.

Adult School - Classes such as blueprint reading, industrial mathematics, industrial pipefitting, steamfitting, mechanical drafting.

Apprenticeship Program - In the Los Angeles area, welding is included in a number of related apprenticeship programs: Ironworkers; Plumbers; Sheet Metal Workers; Steamfitters and Industrial Pipefitters. (5)

Armed Forces - Army: Construction; Engineer Equipment Maintenance; Metalworking. Air Force: Metalworking. Navy: Boilermaker; Shipfitter; Steelworker.

ADVANCEMENT AND OUTLOOK

To lead welder and to various foreman positions depending upon the size of the shop. May be promoted to welding inspector. May open his own welding shop. Welding operations are done in all industries utilizing metal. The long-range prospects are excellent for welders who are trained and experienced in the newer types of welding. This occupation is expected to expand at a faster rate than the total labor force.

RELATED AND SPECIALIST OCCUPATIONS

aircraft welder
atomic welder
body-metal welder
die making welder
oil field welder
pipe line welder
sheet metal worker
shipfitter
spot welder
welder and finisher

FORM BUILDER

D.O.T.: 5-17.060

Industry: Aircraft Manufacturing;
Automobile Manufacturing

Known also as: fixture builder,
jig maker, template maker

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: spatial visualization, form perception, and manual dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques.

Physical Capacities - Medium strength. Ability to reach and handle parts and tools. Visual acuity. Inside working conditions. Noise and vibration from operating machines and power tools.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

Suggested Electives - Junior High: electricity, metal, wood, industrial crafts, industrial drawing. Senior High: mechanical drafting, industrial crafts, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Machinist; Machine Shop, Machine Tool Technology; Manufacturing Technology; Mechanical Technology; Metallurgical Technician; Millwrighting; Tool Design; Tool Engineering Technology. Also, evening courses.

Adult School - Classes such as blueprint reading, machinist, mathematics, millwright, welding.

Apprenticeship Program - Jig and Fixture Builders. (4)

Armed Forces - Army: Metalworking. Air Force: Metalworking. Navy: Boilerman; Instrumentman; Patternmaker.

ADVANCEMENT AND OUTLOOK

To leadman, foreman, plant foreman. May advance to a supervisory or administrative position. May become self-employed as owner and manager of his own job shop. An increasing number of jig and fixture builders will be needed in the future as a result of the anticipated expansion of metalworking activity and a long-range expansion in the aircraft and missile industry.

RELATED AND SPECIALIST OCCUPATIONS

loftsman
mold maker

model maker
pattern maker

D.O.T.: 4-88.081 **HEATER**

Industry: Forging Known also as: furnaceman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to use arithmetic, algebra, and geometry in practical applications. Average: manual dexterity and color discrimination.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques.

Physical Capacities - Medium strength. Ability to reach and handle tools and equipment. Visual acuity. Inside working conditions. Exposure to heat, noise, and vibration.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

Suggested Electives - Junior High: metal, industrial drawing. Senior High: industrial crafts, industrial mathematics, industrial science, mechanical drafting.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: General Engineering Technician; Machine Shop; Mechanical Engineering Technology; Metallurgical Technician; Tool Engineering Technology. Also, evening courses.

Adult School - Classes such as blueprint reading, boilermaking, die sinking, industrial mathematics, ironworking, machinist, metal shop, welding.

Armed Forces - Army: Metalworking; Railway Maintenance. Air Force: Metalworking. Navy: Boilerman; Molder.

ADVANCEMENT AND OUTLOOK

With the necessary education and experience may become a mechanical engineer or go into sales, supervision, or management. Heaters are hired primarily on the basis of replacement needs. Usually, activities in the iron and steel industry rise substantially during periods of prosperity and decline in recessions.

RELATED AND SPECIALIST OCCUPATIONS

manipulator operator
melter
strip roller
tube bender
wire drawer

D.O.T.: 4-75.130

INSTRUMENT MAKER

Any Industry

Known also as: precision-mechanical instrument maker

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: spatial visualization, form perception, motor coordination, and finger and manual dexterities. Average: verbal and numerical aptitudes.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Light strength. Ability to reach and handle small parts and tools. Visual acuity. Inside working conditions. Noise and vibration from operating machines.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

Suggested Electives - Junior High: electricity, metal, industrial crafts, industrial drawing. Senior High: algebra, electronics, geometry, industrial science, mechanical drafting, industrial drafting, science, trigonometry.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Electronics Technician; Machine Shop; Machine Tools Technology; Machinist; Precision Calibration Technician; Tool Design; Tool Engineering Technology. Also, evening courses.

Adult School - Classes such as blueprint reading, machinist, mathematics.

Apprenticeship Program - Machinists. (4)

Armed Forces - Army: Electronics: Precision Maintenance. Air Force: Guided Missiles Systems; Training Devices. Navy: Aviation Electronics Technician; Fire Control Technician; Gunner's Mate; Instrument Man; Patternmaker.

ADVANCEMENT AND OUTLOOK

Most instrument makers have advanced from the ranks of machinists or machine tool operators. As skill and knowledge improve, the instrument maker may advance to a technician classification or supervisory position. There are indications that unique, custom made, and special purpose instruments, all typical products of the instrument maker, will be of increasing importance during the 60's.

RELATED AND SPECIALIST OCCUPATIONS

electrical instrument repairman
instrument technician
jeweler
parts mechanic
precision instrument and toolmaker

D.O.T.: 4-84.610 **IRONWORKER, SHOP**

Industry: Structural and Ornamental Metal Work; Ship & Boat Building and Repair

Known also as: shopman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: manual dexterity. Average: verbal and numerical aptitudes, spatial visualization, form perception, motor coordination, and finger dexterity.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Strength for heavy work. Ability to stoop and kneel; to reach and handle tools and heavy materials. Visual acuity. Inside working conditions. Noise and vibration from operating power tools and equipment. Hazards involving exposure to torches and molten metal, rough metal edges, moving machinery, falling objects, and flying particles.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

(Turn the page.)

Ironworker, Shop
4-48.610

Suggested Electives - **Junior High**: metal, industrial drawing. **Senior High**: mechanical drafting, industrial mathematics, industrial science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - **Two-year Curriculums**: Building Construction Technology; Construction Technology; Civil Engineering Technology; Gas and Electric Welding; General Engineering Technology; Industrial Welding; Machine Shop; Metallurgical Technician; Metal Trades; Tool Engineering Technology; Welding. Also, evening courses.

Adult School - Classes such as blueprint reading, ironworking, mathematics, ornamental ironworking, reinforcing ironworking, structural ironworking.

Apprenticeship Program - Ironworker, Fabricating. (4)

Armed Forces - **Army**: Construction; Metalworking. **Air Force**: Metalworking. **Navy**: Boilermaker; Builder; Shipfitter; Steelworker.

ADVANCEMENT AND OUTLOOK

To foreman, shop foreman, assistant superintendent, superintendent. With some education in engineering, may move into a drafting or estimating job; with additional education, into construction or mechanical engineering. Qualified ironworkers are in great demand during peak periods of construction activity. In periods of normal employment, the supply may be barely adequate. The all-round ironworker is likely to work year-round.

RELATED AND SPECIALIST OCCUPATIONS

boilermaker
ordnance ironworker
reinforcing ironworker
sheet metal worker
structural steel lay-out man
structural steel worker
wire-fence erector

D.O.T.: 4-78.000 thru 4-78.589

MACHINE TOOL OPERATOR

Industry: Machine Shop

Known also as: machine or shop hand. Designated according to the machine, e.g., engine-lathe operator

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. Average: verbal and numerical aptitudes, spatial visualization, form perception, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Light to medium strength. Ability to reach and handle small to large parts and tools. Visual acuity. Inside working conditions. Noise and vibration from operating machines and equipment. Hazards involving proximity to moving mechanical parts and exposure to revolving tools and power equipment; likewise, danger from flying chips.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

(Turn the page.)

Machine Tool Operator
4-78.000 thru 4-78.589

Suggested Electives - **Junior High**: metal, wood, industrial drawing. **Senior High**: industrial mathematics, industrial science, mechanical drafting.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - **Two-year Curriculums**: Machine Shop; Machine Tool Technology; Machinist; Manufacturing Technology; Mechanical Technology; Tool and Die Maker Machinist; Tool Engineering. Also, evening courses.

Adult School - Classes such as blueprint reading, die sinking, industrial mathematics, machinist.

Apprenticeship Programs - Machinists; Tool and Die Makers. (4)

Armed Forces - **Army**: Armament Maintenance; Marine Operations and Maintenance; Metalworking. **Air Force**: Metalworking. **Navy**: Machinery Repairman; Instrumentman.

ADVANCEMENT AND OUTLOOK

With a variety of training and experience to machinist, shop foreman, set-up man, or to supervisor of a battery of operators. The effect of automated machine tools on this occupation in the longer future cannot now be predicted. However, machinists will be needed to produce and maintain the automated machine tools, and machine tool operators who upgrade their skills may become machinists.

RELATED AND SPECIALIST OCCUPATIONS

operator:

boring machine
broaching machine
drill press
engine lathe
milling machine
planer
precision grinder
profiling machine
tapping and threading machine
turret lathe

D.O.T.: 4-75.010

Industry: Machine Shop

MACHINIST

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. **High**: spatial visualization and form perception. **Average**: verbal and numerical aptitudes, motor coordination, and finger dexterit

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to reach and handle small to large parts and tools. Visual acuity. Inside working conditions. Noise and vibration from operating machines and equipment. Hazards involving proximity to moving mechanical parts and exposure to revolving tools and power equipment; likewise, danger from flying chips.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

Suggested Electives - **Junior High**: industrial drawing, metal. **Senior High**: industrial mathematics, industrial science, mechanical drafting.

(Turn the page

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Machinist; Machine Shop (one or two year); Machine Tool Technology; Manufacturing Technology; Mechanical Technology; Millwrighting; Tool and Die Maker; Tool Design; Tool Engineering. Also, evening courses.

Adult School - Classes such as blueprint reading, die sinking, industrial mathematics, machinist, millwright.

Apprenticeship Program: Machinists. (4)

Armed Forces - Army: Armament Maintenance; Marine Operations and Maintenance; Metalworking. Air Force: Metalworking. Navy: Instrumentman; Machinery Repairman.

ADVANCEMENT AND OUTLOOK

To section foreman, shop foreman, supervisor. May go into production or maintenance; specialize on one machine; transfer to jig and fixture building; or go into tool and die making. There are opportunities to become the salesman representative of a machinery manufacturer or to specialize as an experimental machinist or model maker. May open his own machine shop. Employment for machinists is expected to increase in both the nonmetalworking and the metalworking industries throughout the decade.

RELATED AND SPECIALIST OCCUPATIONS

instrument maker
lay-out man
machine set-up man
tool and die maker
tool supervisor

D.O.T.: 4-91.444

MELTER

Industry: Iron and Steel

Known also as: open-hearth furnace melter

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. Average: verbal and numerical aptitudes, spatial visulization, form perception, and color discrimination.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects in situations that result in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to reach and handle tools and equipment. Talking: imparting oral information. Hearing: sensitive, attuned to fine discriminations in sound. Visual acuity. Inside working conditions. Hazards involving exposure to heat. Noise and vibration. Exposure to dust, smoke, and fumes from sulphur and phosphorus.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

Suggested Electives - Junior High: industrial drawing, metal. Senior High: heavy metal, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: General Engineering Technician; Machine Shop; Mechanical Engineering Technology; Metallurgical Technician; and Tool Engineering Technology. Also, evening courses.

Adult School - Classes such as blueprint reading, boilermaking, die sinking, industrial mathematics, ironworking machinist, metal shop, welding.

Apprenticeship Program - There is no formalized apprenticeship program for melter in the Los Angeles area. Locally, openings are filled by upgrading workers from unskilled jobs. When available, this apprenticeship requires two and three years of on-the-job training combined with related classroom instruction.

Armed Forces - Army: Metalworking; Railway Maintenance. Air Force: Metalworking. Navy: Boiler; Molder.

ADVANCEMENT AND OUTLOOK

With the necessary education and experience, may become an industrial engineer or advance into supervision, sales, or management. Melters are hired primarily on the basis of replacement needs. Usually, activities in the iron and steel industry rise substantially during periods of prosperity and decline in recessions.

RELATED AND SPECIALIST OCCUPATIONS

cupola tender
furnace operator

ingot stripper
ladle crane man

D.O.T.: 5-78.100

MILLWRIGHT

Any industry

Known also as: machine erector, machine repairman, machine set-up man, maintenance mechanic

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or shedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: spatial visualization and manual dexterity. Average: verbal and numerical aptitudes, form perception, motor coordination, and finger dexterity.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Strength for very heavy work. Ability to stoop and kneel; to reach and handle small to large parts, tools and equipment. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

Suggested Electives - Junior High: electricity, metal, wood, industrial drawing. Senior High: auto mechanics, electricity, heavy metal, industrial drafting, industrial mathematics, industrial science, machine shop, woodwork.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Machinist; Manufacturing Technology; Mechanical Technology. Also, evening courses.

Adult School - Classes such as blueprint reading, electricity, industrial mathematics, machinist, millwright.

Apprenticeship Program - Millwright. (4)

Armed Forces - Army: Marine Operations and Maintenance; Metalworking. Air Force: Metalworking. Navy: Aviation Boatswain's Mate; Machinery Repairman; Machinist's Mate.

ADVANCEMENT AND OUTLOOK

To millwright foreman, to supervisor. May open his own shop for installing or rebuilding machinery. The trend toward the mechanization of equipment, that is, automation, should result in an increased demand for millwrights; likewise, expenditures for new plant and equipment are expected to increase employment for these workers. An important source of employment at the present time is the missile industry which requires the erection and maintenance of missile "silos."

RELATED AND SPECIALIST OCCUPATIONS

industrial plant lay-out man
machine-tool operator
machine and tool try-out man
machinist
mechanical engineer
tool and die maker
welder

D.O.T.: 5-83.111

Any industry

OFFICE MACHINES SERVICEMAN

Known also as: business-machine mechanic, office-machine inspector, office-machine repairman.

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: spatial visualization. Average: verbal aptitude, form perception, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects in situations that result in tangible, productive satisfaction.

Physical Capacities - Light strength. Ability to reach and handle parts and tools. Talking: giving information and instructions. Hearing: sensitive, attuned to fine discriminations in sounds. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in general metal.

(Turn the page.)

Suggested Electives - Junior High: electricity, metal, industrial drawing. Senior High: drafting, industrial mathematics, industrial science, public speaking.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Office Machine Repairman. Also, evening courses.

Adult School - Classes such as machinist and public speaking.

Apprenticeship Program - Office Machine Reparimen. (4)

Armed Forces - Army: Quartermaster Equipment Maintenance. Air Force: Intricate Equipment Maintenance. Navy: Instrument Man.

ADVANCEMENT AND OUTLOOK

To foreman, to service manager. May move into sales or combine sales with maintenance and repair service. May open his own repair shop. May obtain sales franchises from large companies and become an independent dealer in office machines. The widespread use of business machines and the increasing complexity of office equipment have led to a greater demand for trained servicemen qualified to maintain and repair a diversity of office machines.

RELATED AND SPECIALIST OCCUPATIONS

- accounting-machine serviceman
- calculating-machine serviceman
- computer systems serviceman
- statistical machines serviceman
- systems analyst
- typewriter serviceman

D.O.T.: 5-17.010 PATTERNMAKER, METAL

Industry: Foundry Known also as: machine patternmaker

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to solve practical problems; to interprete a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: numerical aptitude, spatial visualization, form perception, motor coordination, and finger and manual dexterities. Average: verbal aptitude.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, precision instruments, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Physical Capacities - Medium strength. Ability to reach and handle tools and parts. Visual acuity. Inside working conditions. Noise and vibration from operating equipment.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

Suggested Electives - Junior High: metal, wood, industrial crafts, industrial drawing. Senior High: industrial mathematics, industrial science, heavy metal, technical drafting, woodwork.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Cabinetmaking and Millwork; Machine Shop; Machine Tool Technology; Wood and Metal Patternmaking. Also, evening courses.

Adult School - Classes such as blueprint reading, industrial mathematics, machine shop, woodworking.

Apprenticeship Program - Patternmakers, Wood and Metal. (5)

Armed Forces - Army: Metalworking. Air Force: Metalworking. Navy: Patternmaker; Shipfitter.

ADVANCEMENT AND OUTLOOK

To foreman. May open his own patternmaking establishment. Usually, the patternmaker is upgraded in pay to accord with experience and seniority. The number of patternmakers has not grown significantly for several decades. However, replacement needs will provide job opportunities for new workers. Patternmakers who learn the basic woodworking and metalworking skills can find work in related occupations when employment as patternmaker is not available.

RELATED AND SPECIALIST OCCUPATIONS

designer and template maker
experimental mechanic
form builder
loftsman
machinist
model maker
pattern layout man
patternmaker, wood
sample body builder
structural steel layout man
template maker
tool and die maker

D.O.T.: 5-30.210 **PLUMBER**

Industry: Construction Known also as: service-connection maker

PERSONAL REQUIREMENTS

Abilities and Aptitude - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception and manual dexterity. Average: verbal and numerical aptitudes, spatial visualization, motor coordination, finger dexterity, and eye-hand-foot coordination.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques.

Physical Capacities - Strength for heavy work. Ability to climb, balance, stoop and kneel; to reach and handle tools and equipment. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in general metal.

Suggested Electives - Junior High: electricity, metal, wood, industrial drawing. Senior High: architectural and mechanical drafting, heavy metal, industrial mathematics, industrial science.

(Turn the page.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Plumbing; Machinist; Operating and Maintenance Engineering. Also, evening courses.

Adult School - Classes such as blueprint reading, industrial mathematics, industrial pipefitting, plumbing code, welding, steamfitting.

Apprenticeship Program - Plumbers; Steamfitters and Industrial Pipefitters. (5)

Armed Forces - Army: Construction; Maintenance; Marine Operations; Metalworking; Utilities. Air Force: Metalworking; Utilities. Navy: Builder; Shipfitter.

ADVANCEMENT AND OUTLOOK

To plumber foreman, superintendent, estimator. May operate his own business for plumbing fixtures, supplies, and repair. May become a plumbing contractor in which case it is necessary to pass an examination and secure a state license. Opportunities to enter this trade will remain fairly stable. For the most part, openings for new workers will arise as a result of replacement needs due to deaths and retirements.

RELATED AND SPECIALIST OCCUPATIONS

aircraft plumber
fire control sprinkler fitter
lawn sprinkler installer
maintenance plumber
marine plumber
pipe or steam fitter
pipeline installer
plumbing supply counterman
sewer installer
swimming pool installer

D.O.T.: 5-83.941

REGRIGERATION MECHANIC

Any industry

Known also as: air conditioning attendant or mechanic

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: form perception and manual dexterity. Average: verbal and numerical aptitudes, finger dexterity, motor coordination.

Temperaments - Situations involving a variety of duties and frequent change; the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Strength for heavy work. Ability to stoop and kneel; to reach and handle small to large parts, tools, and equipment. Talking: imparting oral information. Hearing: sensitive to fine discriminations in sound. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in light or general metal.

Suggested Electives - Junior High: electricity, metal, industrial drawing.

(Turn the page.)

Senior High: auto mechanics, electronics, industrial mathematics, industrial science, light metal.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Air Conditioning Engineering; Electrical Mechanic; Refrigeration and Air Conditioning; Sheet Metal Work. Also, evening courses.

Adult School - Classes such as air conditioning, blueprint reading, electricity, mathematics, refrigeration, sheet metal, welding.

Apprenticeship Programs - Air Conditioning and Refrigeration (5); Sheet Metal Workers. (4)

Armed Forces - Army: Metalworking; Utilities. Air Force: Utilities. Navy: Machinist's Mate; Shipfitter.

ADVANCEMENT AND OUTLOOK

To foreman, estimator, city or county inspector. With the necessary education, may qualify as a civil or mechanical engineer. May establish his own business for refrigeration maintenance and installation. Openings are expected to grow rapidly, at a faster rate than for the labor force as a whole, due to a continuing increase in the use of refrigeration and air-conditioning equipment.

RELATED AND SPECIALIST OCCUPATIONS

- air-conditioning engineer
- refrigerating engineer
- refrigeration engineer
- refrigeration estimator
- refrigeration inspector
- refrigeration insulator
- refrigeration installer, commercial
- refrigeration operator
- refrigeration parts counterman
- refrigerator cabinet assembler
- refrigerator tester
- sheet metal assembler, refrigerator

D.O.T.: 4-80.010

SHEET METAL WORKER

Industry: Aircraft Manufacturing, Automobile Manufacturing, Automotive Services, Construction, Ship and Boat Building, Sheet Metal.

Known also as: tinker or tinner

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: spatial visualization, motor coordination, and manual dexterity. Average: verbal and numerical aptitudes, form perception, and finger dexterity.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to climb, balance, stoop, and kneel; to reach and handle tools and materials. Visual acuity. Both inside and outside working conditions. Hazards involving exposure to sharp tools and materials. Noise and vibration from operating machines.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in light or general metal

Suggested Electives - Junior High: metal, industrial drawing. Senior High: algebra, geometry, industrial mathematics, industrial science, technical drafting.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - **Two-year Curriculums**: Industrial Technology; Mechanical Technology; Metal Trades; Metallurgical Technician; Sheet Metal; Wood and Metal Finishing. Also, evening courses.

Adult School - Classes such as air balancing and testing, blueprint reading, industrial mathematics, refrigeration and air conditioning, sheet metal, welding.

Armed Forces - **Army**: Metalworking; Utilities. **Air Force**: Metalworking. Navy: Metalsmith; Shipfitter.

Apprenticeship Program - Sheet Metal Worker. (4)

ADVANCEMENT AND OUTLOOK

To sheet metal lay-out man, job or shop foreman, to plant superintendent. May advance to estimator or become a self-employed contractor. With the necessary education, may move into industrial, construction, or air conditioning and refrigeration engineering. May transfer from the construction industry to metal manufacturing industries. The use of air conditioning equipment and prefabricated facings for building exteriors, e.g., porcelain, enamel, aluminum, should help to maintain a high level of employment in this craft.

RELATED AND SPECIALIST OCCUPATIONS

Sheet Metal:

assembler
combination welder
lay-out man
machine operator
tinsmith

D.O.T.: 4-48.010

STRUCTURAL STEEL WORKER

Industry: Construction

Known also as: bridgeman, structural iron erector, structural steel erector

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out instructions in written, oral, or diagram form; to deal with problems involving several concrete variables; to use arithmetic involving fractions, decimals, and percentages. High: manual dexterity and eye-hand-foot coordination. Average: verbal and numerical aptitudes, spatial visualization, form perception, motor coordination, and finger dexterity.

Temperaments - Situations requiring adequate performance under stress when confronted with the critical or unexpected or taking risks; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, or techniques, which result in tangible, productive satisfaction.

Physical Capacities - Light to medium strength. Ability to climb, balance, stoop and kneel; to reach and handle heavy materials. Visual acuity. Outside working conditions. Noise and vibration. Hazards involving falls from catwalks, blows from falling objects, and burns from high heat. Exposure to fumes, odors, and toxic conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

(Turn the page.)

Suggested Electives - Junior High: industrial drawing, metal, wood. Senior High: architectural drafting, industrial mathematics, industrial science, general metal.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Building Construction Technology; Civil Engineering Technology; Industrial Welding. Also, evening courses.

Adult School - Classes such as blueprint reading, industrial mathematics, ironworking - structural and ornamental erectors, ironworking - reinforcing.

Apprenticeship Program - Structural Ironworkers. (3)

Armed Forces - Army: Construction; Metalworking. Air Force: Metalworking. Navy: Boilermaker; Builder; Shipfitter; Steelworker.

ADVANCEMENT AND OUTLOOK

To foreman, assistant superintendent, superintendent. With the necessary education, may move into a drafting or estimating job, or become a civil or mechanical engineer. Employment and advancement may depend on geographical location and willingness to travel. Opportunities should continue to expand. At present, there is a shortage of certified welders in structural steel work.

RELATED AND SPECIALIST OCCUPATIONS

arc welder
flame cutter operator
ironworker, shop
towerman

D.O.T.: 4-76.040

Industry: Machine Shop

TOOL AND DIE MAKER

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: spatial visualization, form perception, and manual dexterity. Average: verbal and numerical aptitudes, motor coordination, and finger dexterity.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to stoop and kneel; to reach and handle small to large parts and tools. Visual acuity. Inside working conditions. Noise and vibration from operating machines and equipment.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in heavy metal.

Suggested Electives - Junior High: electricity, industrial drawing, metal, wood. Senior High: electronics, general metal, industrial mathematics, industrial science, mechanical drafting.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Machinist; Machine Shop; Machine Tool Technology; Manufacturing Technology; Mechanical Technology; Metallurgical Technician; Millwrighting; Tool Design; Tool and Die Maker; Tool Engineering Technology. Also, evening courses.

Adult School - Classes such as blueprint reading, die sinking, machinist, mathematics, millwright, steamfitting, tool design.

Apprenticeship Program - Tool and Die Makers. (4)

Armed Forces - Army: Metalworking; Marine Operations and Maintenance. Air Force: Metalworking. Navy: Instrumentman; Machinery Repairman; Machinist's Mate.

ADVANCEMENT AND OUTLOOK

To a supervisory or administrative position. May become a tool designer. May open a tool and die jobbing shop. An increasing number of tool and die makers will be needed as a result of expansion in the metalworking industries.

RELATED AND SPECIALIST OCCUPATIONS

die maker
die try-out man
draftsman, mechanical
fixture builder
machinist

mold maker
tool designer
tool and die repairman
tool drawing checker

CAREER GUIDANCE OUTLINES . . .

WOODWORK

Cabinetmaker

Carpenter

Furniture Finisher

Furniture Repairman

Lumber Grader

Millman

Patternmaker, Wood

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D.O.T.: 4-32.100

CABINETMAKER

Industry: Woodworking

Known also as: assemblyman, benchwork; cabinet-frame assembler; carpenter, bench; top bench hand

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: spatial visualization. Average: form perception, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to stoop and kneel; to reach and handle tools and materials. Visual acuity. Inside working conditions. Noise and vibration from machines and equipment. Hazards involving exposure to sharp-edged tools and power-driven equipment; to dust; to odors, fumes, and toxic condition from paints, lacquers, and thinners.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in woodwork.

Suggested Electives - Junior High: industrial crafts, industrial drawing, wood. Senior High: industrial crafts, architectural drafting, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Cabinetmaking; Cabinetmaking and Millwork. Also, evening courses.

Adult School - Classes such as blueprint reading, cabinetmaking and millwork, industrial mathematics.

Apprenticeship Program - Cabinetmaking and Millwork. (4)

Armed Forces - Army: Quartermaster Equipment Maintenance. Air Force: Construction. Navy: Builder.

ADVANCEMENT AND OUTLOOK

To foreman of a cabinet, millwork, furniture, or miscellaneous woodworking shop. May become a detailer or an estimator of materials and costs. With additional training may open his own shop for production or custom cabinet construction. Usually, the cabinetmaker is upgraded in pay to accord with experience and seniority. Replacements due to death and retirement will remain steady for some time to come. The increased use of metal and plastics materials is a factor to be considered in the development of cabinetmaking skills.

RELATED AND SPECIALIST OCCUPATIONS

cabinetmaker, maintenance
detailer
furniture worker
piano case maker
picture frame maker
refrigerator cabinetmaker

D.O.T.: 5-25.110

Industry: Construction

CARPENTER

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. Average: verbal and numerical aptitudes, spatial visualization, form perception, motor coordination, finger and manual dexterities, and eye-hand-foot coordination.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Medium strength. Ability to climb, balance, stoop, and kneel, to reach and handle tools and materials. Visual acuity. Both inside and outside working conditions. Hazards involving exposure to sharp-edged tools and power-driven equipment; to falls from scaffolding.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in woodwork.

Suggested Electives - Junior High: industrial crafts, industrial drawing, wood. Senior High: architectural drafting, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Building Construction Technology; Cabinetmaking and Millwork; Carpentry; Construction Estimating; Construction Technology. Also, evening classes.

Adult School - Classes such as blueprint reading, building construction estimating, carpentry, industrial mathematics.

Apprenticeship Program - Carpentry. (4)

Armed Forces - Army: Construction; Marine Operations and Maintenance. Air Force: Construction. Navy: Builder; Damage Controlman.

ADVANCEMENT AND OUTLOOK

To carpenter foreman, construction superintendent, estimator, or building inspector. With additional training may go into business for himself as a building contractor. A growing number of carpenters will be needed in commercial, highway, and industrial construction and in the maintenance departments of factories, commerical establishments, large residential projects, and government agencies. In addition, replacement needs will create job opportunities.

RELATED AND SPECIALIST OCCUPATIONS

boat joiner
cabinetmaker
carpenter, maintenance
finish carpenter
form builder
hardwood floor layer
refrigerator carpenter
roofer, wood shingle
rough carpenter
ship carpenter
ship fitter
shop carpenter
stage carpenter

D.O.T.: 5-16.710

Any industry

FURNITURE FINISHER

Known also as: coater, furniture polisher, recoater, refinisher, wood finisher, finisher

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to understand and apply principles to solve practical problems; to interpret a variety of instructions, in written, oral, diagram, or schedule form; to deal with a variety of concrete variables. High: form perception. Average: manual dexterity and color discrimination.

Temperaments - Situations involving the evaluation of information against sensory or judgmental criteria based on own knowledge and experience; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques, which result in tangible productive satisfaction.

Physical Capacities - Light strength. Ability to reach and handle lightweight tools and finishing materials. Inside working conditions. Exposure to fumes, odors, and toxic conditions from paints, lacquers, thinners, and other finishing materials.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in woodwork.

Suggested Electives - Junior High: industrial crafts, metal, wood. Senior High: general metal, art, industrial mathematics, industrial science.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Cabinetmaking; Painting and Decorating; Wood and Metal Finishing. Also, evening classes.

Apprenticeship Program - Painters - Wood and Metal Finishers. (4)

Armed Forces - Army: Quartermaster Equipment Maintenance. Air Force: Construction. Navy: Damage Controlman.

ADVANCEMENT AND OUTLOOK

To foreman. May establish his own business of furniture finishing and restoration. Continued growth of the population should create additional openings. However, turnover in the furniture finishing industry is somewhat higher than the average turnover for all manufacturing. Most openings in furniture production are filled by upgrading specialized, finishing-room workers to jobs requiring higher skills.

RELATED AND SPECIALIST OCCUPATIONS

appliance painter and refinisher
artificial leg finisher
cabinet maker, maintenance
furniture repairman
furniture repair estimator
metal finisher
painter
painter and decorator
piano and radio refinisher
picture frame finisher
spray painter

D.O.T.: 4-35.710

Any industry

FURNITURE REPAIRMAN

Known also as: furniture upholsterer, upholsterer, upholsterer repairman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out instructions in written, oral, or diagram form; to deal with problems involving several concrete variables; to use arithmetic involving fractions, decimals, and percentages. High: form perception. Average: verbal and numerical aptitudes, spatial visualization, motor coordination, and finger and manual dexterities.

Temperaments - Situations involving a variety of duties and frequent change; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Heavy strength. Ability to stoop and kneel; to reach and handle materials and tools. Visual acuity. Inside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in woodwork.

Suggested Electives - Junior High: industrial crafts, industrial drawing, metal, wood. Senior High: general metal, industrial crafts, industrial mathematics.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Cabinetmaking; Cabinetmaking and Millwork; Furniture Upholstering; Painting and Decorating; Wood and Metal

(Turn the page.)

Finishing. Also, evening classes.

Adult School - Classes such as blueprint reading, cabinetmaking and millwork, furniture repair and refinishing, painting and decorating, upholstery.

Apprenticeship Program - Furniture upholsterers. (3)

Armed Forces - Army: Quartermaster Equipment Maintenance. Air Force: Construction. Navy: Damage Controlman.

ADVANCEMENT AND OUTLOOK

To leadman, foreman, or furniture repair estimator. May establish his own furniture repair business. Employment opportunities should continue to be good, particularly in the custom and repair establishment. Many of these craftsmen are older men for whom replacements will be needed. There is little turnover in the occupations.

RELATED AND SPECIALIST OCCUPATIONS

airplane woodworker
cabinetmaker, maintenance
carpenter
furniture finisher
layout man
lock assembler
millman
samplemaker
seat mender
stock grader
tubular furniture maker

D.O.T.: 4-29.510

LUMBER GRADER

Industry: Woodworking

Known also as: lumber inspector, lumber puller, stockman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out instructions in written, oral, or schedule form; to deal with problems involving several concrete variables; to use arithmetic involving fractions, decimals, and percentages. High: form perception. Average: verbal and numerical aptitudes and color discrimination.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for dealing with things and objects through nonsocial work activities carried on in relation to processes, machines, and techniques.

Physical Capacities - Medium strength. Ability to reach and handle tools and materials. Visual acuity. Outside working conditions.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in woodwork.

Suggested Electives - Junior High: general woodwork, industrial drawing, mathematics. Senior High: architectural drafting, industrial science, mathematics.

(Turn the page.)

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Cabinetmaking; Carpentry; Millwork. Also, evening classes.

Adult School - Classes such as blueprint reading, cabinetmaking and millwork, carpentry, industrial mathematics.

Apprenticeship Program - There is no formalized apprenticeship program for this occupation. Over a three-to-five-year period, on-the-job training in sawmill work includes the occupations of laborer, edgeman, trimmerman, and tallyman prior to entry into the occupation of lumber grader.

Armed Forces - Army: Combat Engineering. Air Force: Construction. Navy: Builder.

ADVANCEMENT AND OUTLOOK

To mill or yard foreman; then to mill superintendent, shipping superintendent, or plant superintendent. May serve on the staff of a forestry farm or lumber association as expert lumber grader. Because of the scarcity of highly skilled graders, employers make every effort to retain them on the payroll during slow months.

RELATED AND SPECIALIST OCCUPATIONS

lumber checker
lumber scaler
parquet flooring grader
select grader
treating inspector

D.O.T.: 4-33.914 MILLMAN

Industry: Woodworking

Known also as: all around machine man, machine carpenter, wood machinist, millwright, woodworker, woodworking machine operator, woodworking millman

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to carry out instructions in written, oral, or schedule form; to deal with problems involving several concrete variables; to use arithmetic involving fractions, decimals, and percentages. High: spatial visualization and manual dexterity. Average: verbal and numerical aptitudes, motor coordination, and finger dexterity.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfactions.

Physical Capacities - Medium strength. Ability to reach and handle tools and materials. Visual acuity. Inside working conditions. Noise and vibration from operating machines and equipment. Hazards in the use of revolving tools and power-driven equipment. Exposure to fumes, odors, and dust.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in woodwork.

(Turn the page.)

Suggested Electives - Junior High: industrial drawing, metal, wood. Senior High: architectural drafting, general metal, industrial crafts, industrial science.

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Building Construction Technology; Cabinetmaking and Millwork; Carpentry; Construction Technology. Also, evening classes.

Adult School - Classes such as blueprint reading, cabinetmaking and millwork, carpentry, industrial mathematics, millwright.

Apprenticeship Programs - Cabinetmakers and Millmen. (4)

Armed Forces - Army: Combat Engineering. Air Force: Construction. Navy: Builder.

ADVANCEMENT AND OUTLOOK

With a thorough knowledge of the various woodworking machines, to set-up man, leadman, or foreman. Foreman, assistant superintendent, and superintendent, are progressive steps in larger shops. Employment prospects are bound up with the construction industry. This is not a fast growing occupation. However, many millmen are over fifty years of age and job opportunities will develop as these men retire.

RELATED AND SPECIALIST OCCUPATIONS

airplane woodworker
cabinetmaker
chisel mortiser operator
furniture repairman
lumber grader
planer operator
router operator
shingle sawyer
wood carver
wood inspector

D.O.T.: 5-17.020

Industry: Foundry

PATTERNMAKER, WOOD

(No alternate title)

PERSONAL REQUIREMENTS

Abilities and Aptitudes - Ability to apply principles to solve practical problems; to interpret a variety of instructions in written, oral, diagram, or schedule form; to deal with a variety of concrete variables; to use arithmetic, algebra, and geometry in practical applications. High: numerical aptitudes, spatial visualization, form perception, motor coordination, and finger and manual dexterities. Average: verbal aptitude.

Temperaments - Situations involving the evaluation of information against measurable or verifiable criteria such as standards, specifications, and scales; the precise attainment of prescribed limits, tolerances, or standards.

Interests - Preference for nonsocial work activities, carried on in relation to processes, machines, and techniques, which result in tangible, productive satisfaction.

Physical Capacities - Strength for heavy work. Ability to reach and handle tools, parts, and equipment of all kinds. Visual acuity. Inside working conditions. Hazards in the use of sharp-edged tools and power-driven equipment.

EDUCATION AND TRAINING OPPORTUNITIES IN JUNIOR AND SENIOR HIGH SCHOOL

Preferred - High school graduation with an Industrial Occupations major in woodwork.

Suggested Electives - Junior High: industrial crafts, industrial drawing, metal, wood. Senior High: heavy metal, industrial mathematics, industrial science.

(Turn the page

EDUCATION AND TRAINING OPPORTUNITIES BEYOND HIGH SCHOOL

Junior College - Two-year Curriculums: Cabinetmaking and Millwork; Patternmaking, Wood and Metal. Also, evening classes.

Adult School - Classes such as blueprint reading, cabinetmaking and millwork, industrial mathematics, patternmaking.

Apprenticeship Program - Patternmakers, Wood and Metal. (5)

Armed Forces - Army: Drafting and Cartography. Air Force: Construction. Navy: Patternmaker.

ADVANCEMENT AND OUTLOOK

To foreman. May open his own patternmaking establishment. Usually, the patternmaker is upgraded in pay to accord with experience and seniority. The number of patternmakers has not grown significantly for several decades. However, replacement needs will continue to provide job opportunities for new workers. Patternmakers learn the basic metalworking or wood working skills which can be used in related fields when employment in this specialty is not available.

RELATED AND SPECIALIST OCCUPATIONS

cabinetmaker
carpenter
die lay-out man
lay-out man, woodworking
mandrel maker
model maker
patternmaker, metal

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B. RESOURCE MATERIALS

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* Suitable also for student use.

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April 1964

ALPHABETICAL INDEX OF OCCUPATIONS

	Subject Area	D.O.T. Code
Airplane Electrician	Electronics	4-97.910
Airport Control Operator	Electronics	0-61.60
Analytical Research Technician (Resins and Adhesives)	Industrial Crafts	0-67.81
Architectural Draftsman	Drafting	0-48.05
Automatic Lathe Hand (Plastics)	Industrial Crafts	7-10.222
Automobile Body Repairman, Metal	Metal	5-81.510
Automobile Mechanic	Auto Mechanics	5-81.030
Bookbinder	Graphic Arts	4-49.010
Cabinetmaker	Woodwork	4-32.100
Camera Repairman	Industrial Crafts	5-83.901
Carpenter	Woodwork	5-25.110
Combination Welder	Metal	4-85.040
Compositor	Graphic Arts	4-44.010
Compression Molding Machine Operator (Plastics)	Industrial Crafts	7-10.014
Computer Systems Serviceman	Electronics	0-66.802
Cylinder Press Man	Graphic Arts	4-48.010
Diesel Mechanic	Auto Mechanics	5-83.931
Electric Motor Repairman	Electronics	5-83.433
Electrical Appliance Serviceman	Electronics	5-83.041
Electrical Draftsman	Drafting	0-48.11
Electrical Repairman	Electronics	5-83.433
Electrician, Airplane	Electronics	4-97.910
Electronics Technician	Electronics	5-83.44
Engine Development Technician, Internal Combustion	Auto Mechanics	0-67.42
Form Builder	Metal	5-17.060
Furniture Finisher	Woodwork	5-16.710
Furniture Repairman	Woodwork	5-35.710
Heater	Metal	4-88.081
Industrial Designer	Drafting	0-46.88
Instrument Maker	Metal	4-75.130
Ironworker, Shop	Metal	4-84.610

	Subject Area	D.O.T. Code
Laboratory Assistant, X-ray Equipment	Electronics	0-67.85
Lathe Hand, Automatic (Plastics)	Industrial Crafts	7-10.222
Leather Worker	Industrial Crafts	6-62.150
Lineman	Electronics	5-53.410
Linotype Operator	Graphic Arts	4-44.110
Lumber Grader	Woodwork	4-29.510
Machine Tool Operator	Metal	4-78.589
Machinist	Metal	4-75.010
Marine Draftsman	Drafting	0-48.16
Mechanical Draftsman	Drafting	0-48.18
Melter	Metal	4-91.444
Millman	Woodwork	4-33.914
Millwright	Metal	5-78.100
Office Machine Serviceman	Metal	5-83.111
Offset Press Man	Graphic Arts	4-48.050
Optician	Industrial Crafts	5-08.010
Patternmaker, Metal	Metal	4-33.914
Patternmaker, Wood	Woodwork	5-17.020
Photoengraver	Graphic Arts	4-47.100
Plumber	Metal	5-30.210
Radio Mechanic, Aircraft Installations	Electronics	5-83.477
Radio Operator, Air Transportation	Electronics	0-61.33
Radio Repairman	Electronics	5-83.411
Refrigeration Mechanic	Metal	5-83.941
Salesperson, Automobile Parts	Auto Mechanics	1-75.22
Sheet Metal Worker	Metal	4-80.010
Shoe Repairman	Industrial Crafts	4-60.100
Structural Steel Worker	Metal	4-84.010
Systems Testing Laboratory Technician	Electronics	0-67.16
Technical Illustrator	Drafting	0-48.32
Telephone Installer	Electronics	5-53.030
Tool Designer	Drafting	0-48.41
Tool and Die Maker	Metal	4-76.210
Truck Mechanic	Auto Mechanics	5-81.030
Vari-Typist	Graphic Arts	1-37.38
Welder, Combination	Metal	4-85.040